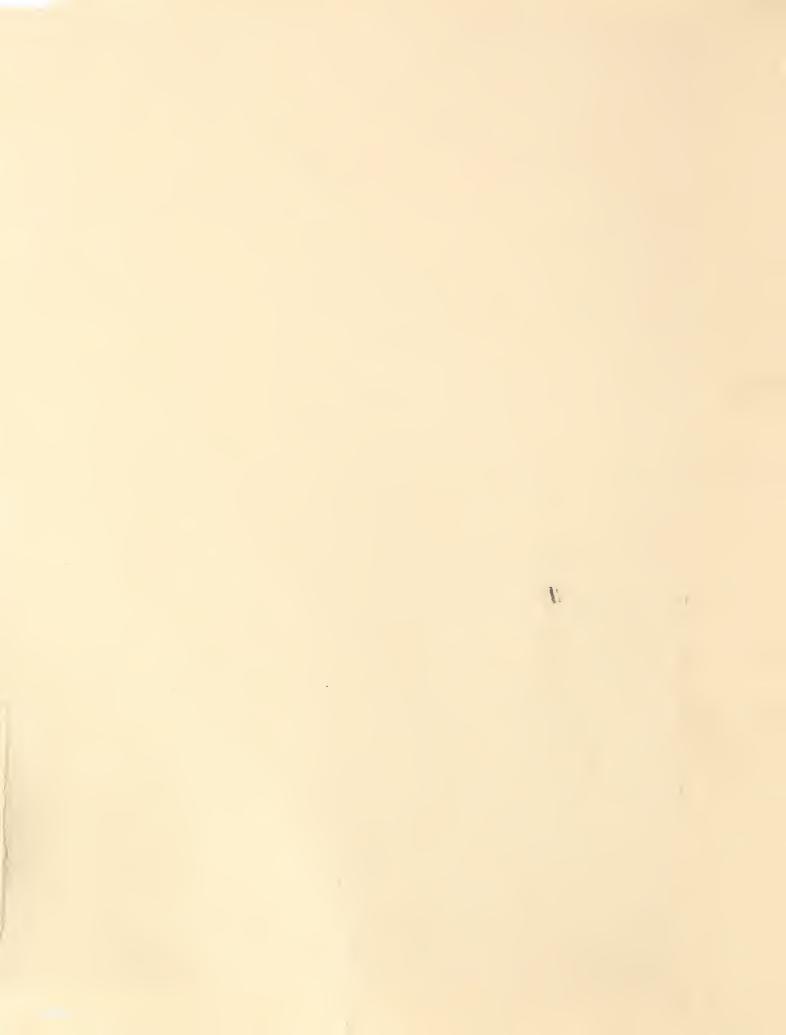
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United States Department of Agriculture

Rural Electrification Administration

REA Bulletin 1728C-100

July 1994

List of Materials

Acceptable for Use on Systems of REA Electrification Borrowers



UNITED STATES DEPARTMENT OF AGRICULTURE Rural Electrification Administration

REA BULLETIN 1728C-100

SUBJECT: <u>List of Materials Acceptable for Use on Systems of REA</u> Electrification Borrowers

TO: All REA Electric Borrowers

PUBLICATION DATE: Date of Administrator's signature below

EXPIRATION DATE: Not to exceed 3 years from publication date

OFFICE OF PRIMARY INTEREST: Chairman, Technical Standards Committee "A" (Electric), Office of the Director, Electric Staff Division

PREVIOUS INSTRUCTIONS: The publication of this bulletin replaces REA Bulletin 1728C-100, issued July 1993, and the three subsequent Bulletin 1728C-100 Supplements issued since July 1993. This issuance constitutes a new base issue of the List of Materials Acceptable for Use on Systems of REA Electrification Borrowers [List of Materials (Electric)] which, for the next year, will be updated to reflect additions, deletions and corrections by the issuance of supplements as needed.

FILING INSTRUCTIONS: Discard REA Bulletin 1728C-100, dated July 1993 and supplements dated October 1993 and January and April 1994, and replace them with the attached issue of REA Bulletin 1728C-100.

PURPOSE: To provide a convenient informational and updated reference list of the items of materials and equipment that have been determined by REA to be acceptable for use on systems of REA Electrification Borrowers. The publication date is the approval date of the publication of this issue and not necessarily the date of REA acceptance of the items of material or equipment listed. Acceptance, removals or other actions relating to REA's actions pertaining to items of material and equipment are the result of decisions which are made by the Administrator of REA, by Technical Standards Committee "B" (Electric), or by Technical Standards Committee "B" (Electric) acceptance or removal are as of the effective date of final action taken by the aforementioned.

Administrator

Date



PREFACE

This list supersedes all preceding issues including revisions. Revised sheets reflecting changes in the list will be issued quarterly and should be inserted in order to keep your copy up to date.

The items shown in this publication include material and equipment for transmission and distribution facilities. Items not listed include office equipment, tools and work equipment, items of electric general plant and consumer owned wiring facilities. The listings apply only to new items of material and equipment and not to used items.

In addition to items accepted on a general basis, this list also includes items accepted on a conditional basis. As one of the conditions in the listing of an item on a conditional basis, contractors are required to obtain the borrower's concurrence prior to its use.

The inclusion of an item in this list does not indicate that item's manufacturer or its principals have not been debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded pursuant to Executive Order 12549, Debarment or Suspension, or any rules or regulations issued thereunder, including 7 CFR Part 3017 ("Debarment Regulations"). Therefore, borrowers must comply with the requirements imposed by the Debarment Regulations before entering into any "covered transaction", as defined by 7 CFR Part 3017, involving any item on this list.

The acceptance of an additional item or the deletion of an existing item is a function of the Technical Standards Committees. Any manufacturer desiring to have a new item placed on the list, or any user believing an existing item should be removed from the list, is invited to submit the matter to the Committees. Any communication calling attention to an error or omission in the list, such as a wrong catalog number, an obsolete item, etc., will be appreciated. All communications should be addressed to Technical Standards Committee "A" (Electric), Rural Electrification Administration, U. S. Department of Agriculture, Washington, D. C. 20250.



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a - Insulator, pin type

<u>Specifications</u>

5 kV - used on 2.4 kV and 4.16/2.4 kV systems



Chance C905-1302*

**Cooper Power Systems NP8D8*

(McGraw-Edison)

Porcelain Products 253

(Knox)

Victor Insulators, Inc. 8

		Radio-
ANSI Class 55-2	<u>Plain</u>	<u>freed</u>
Flashover, dry	50 kV	45 kV
Flashover, wet	25 kV	25 kV
Leakage distance	5 in.	5 in.
Pinhole diameter	1 in.	1 in.

12.5/7.2 kV - used on 12.5/7.2 and 13.2/7.62 kV systems



Chance C905-1303*
Cooper Power Systems NP9D8*
(McGraw-Edison)
Joslyn (Pinco) L63R*
Porcelain Products 261-S*
(Knox)
Victor Insulators, Inc. 5*

	Radio-
<u>Plain</u>	<u>freed</u>
65 kV	55 kV
35 kV	30 kV
7 in.	7 in.
1 in.	1 in.
	65 kV 35 kV 7 in.

15 kV - used on 12.5/7.2 and 13.2/7.62 kV systems where greater insulation is needed



Chance C905-1304*
Cooper Power Systems NP21D8*
Joslyn (Pinco) L2064R*
Porcelain Products 366-S*
(Knox)
Victor Insulators, Inc. 6*

				ка	alo-
ANSI Class	55-4	Pla	<u>ain</u>	fr	eed
Flashover,	dry	70	kV	65	kV
Flashover,	wet	40	kV	35	kV
Leakage dis	tance	9 :	in.	9	in.
Pinhole dia	meter	1 :	in.	1	in.

*Radio-freed

**Available in white as indication of neutral. White insulators are non-radio-freed.

Radio-freed and non-radio-freed insulators made by these manufacturers and in these styles are acceptable.

NOTE: Post insulators (Item ea) may be substituted for the crossarm pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

a - Insulator, pin type (Radio-freed)

Specifications Used on 24.9/14.4 kV distribution lines. Radio noise free, metal timble.



Chance C906-1311 Joslyn (Pinco) L1123-R Porcelain Products 1027-S (Knox)

27-R*

245-R

Victor Insulators, Inc.

ANSI Class 56-1 Flashover, dry 95 kV Flashover, wet 60 kV Leakage distance 13 in. Pinhole diameter 1-3/8 in.

*Does not have a metal thimble.

Used on 33 - 34.5 kV transmission lines. Metal thimble



Chance C906-1303 Joslyn (Pinco) L75-R Porcelain Products 2045-S (Knox) Victor Insulators, Inc.

ANSI Class 56-3 Flashover, dry 125 kV Flashover, wet 80 kV 21 in. Leakage distance Pinhole diameter 1-3/8 in.

Used on 44 - 46 kV transmission lines. Metal thimble

Victor Insulators, Inc. 255-R



ANSI Class 56-4 Flashover, dry-wet 140-95 kV Leakage distance 27 in. 1-3/8 in. Pinhole diameter

NOTE: Post insulators (Item ea) may be substituted for the crossarm pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

Manufacturer	Meeting No. <u>and Date</u>	<u>Conditions</u>
*Chance C906-1321 24.9/14.4 kV ANSI Class 56-1	1274 02/09/84	To obtain experience.
*Porcelain Products 1027-ST 24.9/14.4 kV ANSI Class 56-1	1442 03/05/92	To obtain experience.

NOTE: Post insulators (Item ea) may be substituted for the crossarm pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

^{*}Does not have metal thimble.

b - Pin, pole top, steel

DISTRIBUTION

	12.5/7.2 or 13.2/7.62 kV	24.9/14.4 kV
Pin length, inches :	20	20
Thread diameter, inches:	1	1-3/8
Hole spacing, inches :	8	8
REA Specification :	D-3	DT-3
Chance	2199	2195
Cooper Power Systems (McGraw-Edison)	DP19P6	DP19P5
Dixie	D-2172-R	D2195-R
Flagg	F220	F220-1
Joslyn	J740	J720
Kortick		K8086
Utilities Service	36606F-REA	36652

Pins listed below have 4-1/2" offset which eliminates the use of Item cs

Chance	C206-0271
Cooper Power Systems	DP28P1
(McGraw-Edison)	
Joslyn	J25179
Utilities Service	36549

TRANSMISSION

Pin Length, inches Thread diameter, inches Hole spacing, inches REA Specification	: : : : : : : : : : : : : : : : : : : :	24 1-3/8 8 DT-3
Chance Cooper Power Systems		2196 DP19P8
(McGraw-Edison)		
Joslyn		J824
Kortick		K8087
Utilities Service		36653F

- NOTE 1. Pole top bracket (Item eb) and post insulator (Item ea) may be substituted for pole top pin (Item b) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.
 - 2. Flared type pins may be mounted with either side against the pole.

c - Bolt, machine

Applicable Specification: ANSI C135.1,

"Standards for

Galvanized Steel Bolts and Nuts" except that the lengths are in the ranges given below.

Applicable Sizes : 1/2 inch diameter, 6 through

10 inch length

5/8 inch diameter, 6 through

24 inch length

3/4 inch diameter, 6 through

26 inch length

7/8 inch diameter, 6 through

28 inch length

The following manufacturers have shown compliance with the applicable specifications for machine bolts:

A. B. Chance Company *Cooper Power Systems (McGraw-Edison)

Dixie Electrical Manufacturing Company

Hughes Brothers

*Joslyn Manufacturing Company Kortick Manufacturing Company

*Portland Bolt & Manufacturing Company

The Rockford Bolt & Steel Company Steel City Bolt & Screw Co., Inc.

Utilities Service Company



^{*&}quot;Static proof" design available.

d - Washers, Flat

FLAT ROLLED STEEL

Size, inches: 2-Thickness, in.: Hole Diam., in.:	3/16	3 x 3 1/4 13/16	4 x 4 3/16 13/16		-3/8 round 2 gauge 9/16	1-3/4 round 10 gauge 11/16
C & C Spacer	4					
Chance	6814	6817	6818	6819-1/2	6803	6805
Cooper (McGraw-	DF2W5	DF2W7	DF2W10	DF2W15	DF1W2	DF1W3
Edison)						
Dixie	D6814	D6817	D6818	D6819-1/2	D6803	-
FWC	FW1076		FW1080		FW1086	FW1088
Hughes	SW2-70	SW3-70	SW4-70	SW4-70(1/2) RW1-3/8-50) -
Joslyn	J1076	J1079	J1080	J1473	J1086	J1088
Kortick	K1553	K1555	K1557	K1559-1/2	K1524	K1525
Line Hardware	SWF-225B	SWF-300B	SWF-400A	-	-	-
Utilities						
Service	5485	5487A	5488	5490A	5478	5479

Flat Cast

Size, inches: 3 X 3 Thickness, in.: 1/4 Hole Diam., in. 13/16

Chance (N) BB214 Flagg (MIF) (N) P56A

SPURRED

3" Round, 3/16" Thick, 13/16" Hole

Continental (N) TCSF-30-6 Flagg (MIF) (M) PX159A

- (A) Aluminum Alloy(M) Malleable Iron(N) Nodular Iron

Washers, Curved

CURVED CAST

Size, inches: Thickness, in.: Hole Diam., in.:	2-1/4 x 2-1/4 1/4 11/16	3 x 3 5/16 11/16	3 x 4 7/16 15/16	4 x 4 1/2 13/16
American Connector (A) Atlas Power Products (CW 33-5	CW 34-7	CW 44-6 FWC-44-6
Chance (N)	GCW1A	GCW31	CRW4A	' GCW41
Continental (N)	-	CW-33-5	CW-34-7	CW-44-6
Flagg (MIF)(M)	P141	P143	P120	P144
Line Hardware (M)		CSW-33	CRW-34	CSW-44
Reliable/Bethea (A)	-	WC-33-5	WC-34-7	WC-44-6
Universal Electric (A)	₩-225	UW-335	UW-347	UW-446

- (A) Aluminum Alloy
- (M) Malleable Iron
- (N) Nodular Iron

CURVED ROLLED STEEL

Sizes, inches:	3 X 3	4 X 4(1)
Thickness, in.:	5/16	1/4
Hole Diam., in.:	11/16	15/16
Joslyn (Steel)	J114	J6829

(1) To be used only on transmission systems.

f - Pin, crossarm
(With square washer, nut and MF locknut)

DISTRIBUTION

Thread (inches diam.)	1	1-3/8	1	1-3/8
Length above base (in.)	5	7	5	7
Length below base (in.)	5-3/4	7	1-1/2	1-3/4
Shank (inches diam.)	5/8	5/8	5/8	3/4

	Long Sh	nank	Short	Shank
Chance	881	4717	886	_
Cooper Power Systems (McGraw-Edison)	DP2S1*	DP3T1*	DP2S37*	DP5T22*
Dixie	D881	-	-	_
Joslyn	J203*	J647*	J221*	J630*
Kortick	K7104	K7611	K7122	K7631
Utilities Service	558	3137A	579	3142

Clamp Type Pin

		
Thread (inches diam.) Length above base (in.)	1 5-3/4	1-3/8 7
Chance Cooper Power Systems (McGraw-Edison)	14322 DP2C1	14322-1 DP2C11
Dixie	D3322	D3324

J3322



J3324

Washer Plate for Clamp Type Pin

These plates are equipped with lugs to prevent slippage of pin along crossarm. They may be used to replace the bottom plate on pins already installed.

Chance	450091
Cooper Power Systems	DP9X1
(McGraw-Edison)	
Joslyn	J3322-P

Joslyn

^{*&}quot;Static proof" designs available.

f - Pin, crossarm
(With square washer, nut and locknut)

TRANSMISSION

Thread (inches diameter)	1-3/8	1-3/8
Length above base (inches)	10	10
Length below base (inches)	7	1-3/4
Shank (inches diameter)	3/4	3/4

	Long Shank	Short Shank
Chance	4332	-
Cooper Power Systems (McGraw-Edison)	DP7T9*	DP5T24*
Joslyn	J610*	J633*
Kortick	K7643	K7635
Utilities Service	3140	3145

^{* &}quot;Static proof" designs available.

f- Pin, crossarm (Non-lead threads) (With square washer, nut and MF locknut)

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	Conditions
Joslyn J203Z, 1" thread, 5-3/4" shank	1457 11/19/92	To obtain experience.
J221Z, 1" thread, 1-1/2" shank		
J647Z 1-3/8" thread, 7" shank	1474 10/07/93	To obtain experience.
J630Z 1-3/8" thread, 1-3/4" shank		

h - Brace, crossarm, steel

Wherever item h is shown on a construction drawing, use a brace from page cu.

i - Bolt, carriage

Applicable Specification: ANSI C135.1, "Standard for

Galvanized Steel Bolts and

Nuts."

Applicable Sizes : 3/8 inch diameter, 3 through

6 inch length

1/2 inch diameter, 3 through

6 inch length

The following manufacturers have shown compliance with the applicable specifications for carriage bolts.

A. B. Chance Company
Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
Hughes Brothers
Joslyn Manufacturing Company
Kortick Manufacturing Company
The Rockford Bolt Steel Company
Utilities Service Company



j - Screw, lag

Applicable Specifications: ANSI C135.3 "Standard for

Zinc Coated Ferrous Lag

Screws"

Applicable Sizes : 1/2 inch diameter, 4 inch length

1/2 inch diameter, 5 inch length

5/8 inch diameter, 4 inch length

5/8 inch diameter, 5 inch length

The following manufacturers have shown compliance with the applicable specifications for lag screws:

A. B. Chance Company Cooper Power Systems (McGraw-Edison) Dixie Electrical Manufacturing Company Joslyn Manufacturing and Supply Company Kortick Manufacturing Company Utilities Service Company



k - Insulators, suspension

ANSI Class	52-9A	52-1	52-4	52-3
Type	Clevis	Clevis	Clevis	Ball & Socket
Disc Diameter	4-1/4"	6"	9" or 9-1/2"	9" or 9-1/2
M & E Rating, lbs.	10,000	10,000	15,000	15,000
Leakage	6-3/4"	7"	11-1/2"	11-1/2"
Псакаде	0 3/4	,	<u> </u>	11 1/2
Flashover; kV: Dry Wet	60-30	60-30	80-50	80-50
NOTES	(3) (4)	(3) (4)	(5)	(2)
	<u> </u>	1-7 1-7	v = 1	

Manufacturer Catalog Number

Chance	C907-1009	C907-1001	_	_
Joslyn (Pinco)	L1814	L1510	L-970	L-960
Lapp	-	-	9100	9000
Locke	16044	16583	15S410	15S409
Porcelain Prod. (Knox)	84300	86012	-	-
Sediver	CT-4R2-M	-	-	-
Victor Insulators, Inc.	817	804	_	_

Notes:

- (2) To be used only on transmission lines.
 (3) To be used only on distribution lines.
 (4) Use two insulators for 12.5/7.2 kV deadends and three insulators for 24.9/14.4 kV deadends.
- (5) Use two insulators for 24.9/14.4 kV deadends.

k - Insulators, suspension

ANSI Class Type	52-3 Ball & Socket	52-4 Clevis	52-5 Ball & Socket	52-6 Clevis
Disc Diameter	10"	10"	10"	10"
M & E Rating, lbs.	15,000	15,000	25,000	25,000
Leakage	11-1/2"	11-1/2"	11"	11"
Flashover; kV: Dry Wet	80-50	80-50	80-50	80-50
NOTES	(2)	(1)	(2)	

<u>Manufacturer</u>		<u>Catalog Number</u>				
ICI (Pinco)	L1060	L1070	L1500	7	L1570	
Lapp	8200	8100	301425		2300	
Locke	20S840	20S580	30S255		30S257	
Porcelain Prod. (Knox	3) 81022	81012	-		-	
Sediver	-	CT-8R2	-		-	



Notes: (1) Use two for 24.9/14.4 kV deadends. (2) To be used only on transmission lines.

k - Insulator, suspension

	Meeting No.	
<u>Manufacturer</u>	<u>and Date</u>	Conditions
Codino		
<u>Sediver</u>		
10" suspension insulator	997	To obtain experience.
-	07/27/72	-
N-8R2 (ball & socket, 20,000	1068	
lbs.)	06/27/72	
CT-14R2 (clevis, 30,000 lbs.)	1186	Same as above.
	05/08/80	
N-14R2 (ball & socket, 30,000	1175	
lbs.)	11/02/79	
	1297	
•	04/11/85	

k - Insulator, polymer distribution deadend

<u>Manufacturer</u>	Meeting No. and Date		<u>Conditions</u>
<u>Chance</u>			
Distribution deadend Type "E"	1430 08/22/91	1.	To obtain experience.
Catalog No. C654-3015	00/22/51	2.	For use as deadends
(15 kV line-to-line)	1451		on distribution
Catalog No. C654-3025 (25 kV line-to-line)	07/30/92		lines only.
Catalog No. C654-3034		3.	Not recommended for use
(35 kV line-to-line)			in areas subject to contamination.
Dulmison			
Distribution deadend	1158	1.	. ,
H-15 kV-4 H-25 kV-6	03/01/79 1208	2. 3.	(, , , , , , , , , , , , , , , , , , ,
H-25 KV-6	03/19/81	3.	same as (3) above.
	1393		
	11/09/89		
Joslyn			
Distribution deadend	1074	1.	Same as (1) above.
UDI 671-3002	09/25/75	2.	
(15 kV line-to-line)	1088	3.	Same as (3) above.
Distribution deadend	04/15/76 1074		
UDI 671-3010	09/25/75		
(25 kV line-to-line)	1088		
	04/15/76		
K-Line			
Distribution deadend	1484	1.	Same as (1) above.
KL-15	04/14/94	2.	(-,
KL-25		3.	Same as (3) above.
Lapp			- (-)
Distribution deadend	1282	1.	
Catalog No. 151001, 15kV Catalog No. 151002, 25kV	06/21/84	2. 3.	Same as (2) above.

NOTES: When insulators from this page are used, adjust construction drawing material list quantities as necessary. Recommended maximum working load is 5,000 lbs.

k - Insulator, polymer distribution deadend

Manufacturer	Meeting No. <u>and Date</u>		<u>Conditions</u>
<u>Ohio Brass</u> "Veri*Lite"	1347 08/13/87	1.	To obtain experience.
Type PDI-15 (15 kV)	1410 08/16/90 1420	2.	For use as deadends on distribution lines only.
Type PDI-25 (25 kV and 35 kV)	03/14/91	3.	Not recommended for use in areas subject to contamination.
Porcelain Products			
Distribution deadend PDEI-15, 15 kV	1456 11/05/92	1.	Same as (1) above.
PDEI-25, 25 kV	1475 10/21/93	2.	Same as (2) above.
	1480 01/25/94	3.	Same as (3) above.
Salisbury			
Distribution deadend 9501 Series, 15 kV	1226 01/07/82	1.	Same as (1) above.
9502 Series, 25 kV	1304 08/08/85	2.	Same as (2) above.
	1291 12/20/84	3.	Same as (3) above.
Sediver			
Distribution deadend ODI-11-70-15 (15 kV)	1464 03/25/93	1.	Same as (1) above.
ODI-15-70-28 (25 kV) ODI-17-70-35 (35 kV)	03, 23, 33	2.	Same as (2) above.
		3.	Same as (3) above.

NOTES: When insulators from this page are used, adjust construction drawing material list quantities as necessary. Recommended maximum working load is 5000 lbs.

1 - Clamp, deadend

DISTRIBUTION

Copper 2 t	hrough 6		ACSR (A	Aluminum Clam	os)
CWC 4A thr	_	4/0 & 3/0	2/0	1/0	2 & 4
-	Alcoa	302	302	302	302
-	American Connector Engineering	QDA-63	QDA-53	QDA-53	QDA-53
80500-2000	Anderson/Sq.D	PG-57N	PG46N	PG-46N	PG-46N
-	Atlas		ADQ-53-1-N	ADQ-53-1-N	ADQ-53-1-N
-	Continental	AQD-63	AQD-52	AQD-52	AQD-52
-	C & R	CR-20-90	CR-10-90	CR-10-90	CR-10-90
-	Lapp	306120N	306118N	306118N	306118N
-	Reliable/Bethea	DA-20N	DA-15-N	DA-15-N	DA-15-N

1 - Deadend for steel strand (overhead ground wire)

TRANSMISSION

For high strength, extra high strength steel strand and aluminum clad steel strand

	Extra High Strength	5/16" 3/8" 7/16"			861022 861225 861430			HG528-20M HG209-5/16 HG210-3/8 HG211-7/16	* Class B galvanizing. When overhead groundwire has Class C galvanizing, formed deadend should also have Class C galvanizing.
		7 NO. 7 AWG		YTW7M7Y	861430		20M-AWTLG	HG528-20M HG	rmed deadend show
Compression Type	Aluminum-clad steel	7 No. 8 AWG		YTW7M8T	861227	Formed Type*	16M-AWTLG	HG525-16M	galvanizing, fo
COU	Alumi	7 No. 9 AWG		YTW7M9T	861225	Form		HG523-12.5M	ire has Class C
	gth Steel	7/16"	4627.14	YTW438E	861430			HG211-7/16 HG523-12.5M	rhead groundw
	High Strength	3/8"	4620.12	YTW375E	861255			HG210-3/8	ig. When ove:
		Manufacturer	Alcoa	Burndy	Fargo		Chance	Helical Line Prod.	* Class B galvanizir

			Automa	Automatic Type				
Fargo	GDE-302	GDE-303	GDE-302	GDE-302	GDE-303	GDE-301 GDE-302 GDE-303	302 GDE	-303
Reliable	5202	5203	5202	5202	5203	5201 5202	2 5203	æ

Clamp Type			
	SWDE-55N	FQD-55-3-LW	
	SWDE-55N	FQD-55-3LW	FD-550-N
	Anderson/Sq. D	Continental	Reliable/Bethea

1 - Clamp, deadend

DISTRIBUTION

2-Bolt Straight Line, Aluminum Alloy

Manufacturer	Meeting No. and Date	Conditions
*American Connector Engineering Aluminum alloy deadend Catalog No. SDA 53 (#4-3/0 ACSR)	1338 04/02/87	 To obtain experience. Applications limited to replacements under hot line conditions.
*Anderson/Square D Aluminum alloy deadend Catalog No. ADSO-88 (#2-1/0 ACSR) Catalog No. ADS-48-N (2/0 ACSR) Catalog No. ADS-60-N (3/0 ACSR)	1130 01/05/78 1407 06/28/90 1148 09/28/78	Same as above.
*Burndy Aluminum alloy deadend Catalog No. CUW26RE-1 #2-2/0 Str. Aluminum #4-2/0 ACSR	1255 03/24/83	Same as above.
*C & R Products Catalog No. CRDE-10-180 (No. 4 thru No. 2/0 ACSR) Catalog No. CRDE-20-180 (No. 3/0 and No. 4/0 ACSR)	918 05/15/69 1331 11/20/86	 To obtain experience. Applications limited to replacements under hot line conditions.
*Chance Aluminum alloy deadend Catalog No. SDF10A (4 through 4/0 ACSR)	871 07/06/67 1447 05/28/92 1448 06/11/92	Same as above.

^{*}Straight line deadend clamps are applicable for urban construction where tensions are moderate and on lines often worked hot.

1 - Clamp, deadend

DISTRIBUTION

2-Bolt Straight Line, Aluminum Alloy

Manufacturer	Meeting No. and Date	<u>Conditions</u>
*Continental Aluminum Alloy deadend Catalog No. HDSO-57 (with side opening) (4-4/0 ACSR) Catalog No. SGA-52-23 (4-2/0 ACSR) Catalog No. SGA-60 (3/0-4/0 ACSR)	1244 10/07/82	Same as above.
*Farqo Aluminum alloy deadend Catalog No. GD-961A side opening keeper (No. 4 and No. 2 ACSR) Catalog No. GD-972A (2/0, 3/0, 4/0 ACSR)	1258 05/05/83 1144 08/03/78 791 04/30/64	Same as above.
*Reliable/Bethea Aluminum alloy deadend Catalog No. ASO-684-2	961 02/18/71	Same as above.
(1/0, 2/0, 3/0 ACSR) Catalog No. ASD-2-N (4-2/0 ACSR) Catalog No. ASD-34-N	1201 12/04/80	Same as above.
3/0, 4/0 ACSR	1371 10/06/88	Same as above.

^{*}Straight line deadend clamps are applicable for urban construction where tensions are moderate and on lines often worked hot.

1 - Clamp, deadend

DISTRIBUTION

(wedge type)

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	<u>Conditions</u>
<u>Farqo</u>		
Catalog No. GDW-010 (#4 - 1/0 ACSR)	1469 06/17/93	To obtain experience.
Catalog No. GDW-040 (2/0 - 4/0 ACSR)	1469 06/17/93	To obtain experience.
Catalog No. GDW-556 (266.8 - 477 kcmil ACSR)	1469 06/17/93	To obtain experience.

m - Clamp, suspension

2 BOLT - DISTRIBUTION

	Copper & CWC	ACSR w	rith Straight or	Formed Armo 1/0 & 2/0	r Rods 3/0 & 4/0
ABB	6240	6241	6242	6243	6244
Alcoa					HSU*
American Connector	FLS-53	ALS-62	ALS-62	ALS-86	ALS-105
Anderson/Square D	MS-46-N	MS-60-N	MS-70-N	HAS-85-N	HAS-104-N
C & R Products	-	-	-	CRSC-1	CRSC-2
Chance	FWG1	FWG2	FWG3	FWG4	-
Continental Electric	FSC-46-N	FSC-60-N	SC-70-N	SC-85-N	SC-105-N
Dulmison	-	-	-	-	HSU*
Lapp	305740N	306027N	306028N	306029N	306030N
Preformed	-	-	-	-	AGS*
Reliable/Bethea	FS-46-N	GW-1-N	LS-0-N	LS-1-N	LS-2-N

^{*}Accepted for larger sizes.

m - Clamp, Suspension

ANGLE - DISTRIBUTION No. 2 & 4 ACSR Plus Rods		2-BOLT TRANSMISSION For 3/8" Steel Overhead Ground Wire
2300	ABB	6240
-	American Connector	FLS-53
AAC-301 & 302	Anderson/Square D	MS-46-N
-	Chance	FGW1
AC-75	Continental	FSC-46N
GD-907A	Fargo	-
306092	Lapp	305740N
AC-60	Line Hardware	-
RALS-1	Reliable/Bethea	FS-46-N

n - Bolt, double arming

Applicable Specification: ANSI C135.1, "Standard for

Galvanized Steel Bolts and

Nuts."

Applicable Sizes : 5/8 inch diameter, 12 inch

through 24 inch length

3/4 inch diameter, 20 inch through 24 inch length

The following manufacturers have shown compliance with the applicable specifications for double arming bolts:

A. B. Chance Company

*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company

Hughes Brothers

*Joslyn Manufacturing and Supply Company

Kortick Manufacturing Company

Portland Bolt & Manufacturing Company Steel City Bolt & Screw Co., Inc.

Utilities Service Company



*"Static proof" designs available.

o - Bolt, eye, oval

Applicable Specification: ANSI C135.4, "Standards for

Galvanized Ferrous Eye Bolts and Nuts for Overhead Line

Construction."

Applicable Sizes : 5/8 inch diameter, 6 inch

through 20 inch length

3/4 inch diameter, 8 inch through 20 inch length

The following manufacturers have shown compliance with the applicable specifications for oval eye bolts:

Berny's Forging Company
A. B. Chance Company

*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company

*Joslyn Manufacturing Company Kortick Manufacturing Company Utilities Service Company

*"Static proof" designs available.



Shoulder Eye Bolt for Transmission Structures

3/4 inch diameter, 8 inch through 20 inch length

Catalog Number

Joslyn J9528 to J9540 Kortick K9558 to K2570

p - Connectors, distribution (Parallel Groove)
 Applicable Specification: ANSI C119.4

ACSR to ACSR
To same size or smaller
Bare Conductor

	4/0 - 2/0	=	1/0	2	4
Alcoa	-	396	5.6	490.0	490.0
Anderson/Sq. D	LC-53A	LC-	-51C	LC-51A	LC-51A
Blackburn	PAE 4141-9	PAI	E 2121-9	PAE 2121-9	PAE 2121-9
Burndy	KVS28A	UCC	325R	UC25R2R	UC25R2R
Connector Mfg.	APC-2/0	APO	2-2/0	APC-1/0	APC-1/0
Fargo	GA-9040L	GA-	9020L	GA-9002L	GA-9003L
Penn-Union	PCAA-20BF	PC	AA-15BF	PCAA-10BF	PCAA-10BF
Reliable/Bethea	APG-3	APO	G-2	APG-1	APG-1
		Over A	Armor Rods		
	3/0	2/0	1/0	2	4
Anderson/Sq. D	LC-83A	LC-52C	LC-52C	LC-52C	LC-52C
Blackburn	-	-	PAA10	PAA10	PAA10
Burndy	-	-	UC32R	UC32R	UC32R
					~
Fargo	GA-9843	GA-9842	GA-9041L	GA-9020L	GA-9020L
Fargo Penn-Union	GA-9843 -	GA-9842 -	GA-9041L ARC-12	GA-9020L ARC-11	GA-9020L ARC-14

p - Connectors, Distribution (Parallel Groove)
Applicable Specification: ANSI C119.4

ACSR to Copper or Copperweld-Copper

ACSR Size (Bare Conductor)

	3/0	2/0	1/0	2	4
Alcoa	197	R193	R193	195	195
Anderson/Sq. D	LC-811A	LC-811A	LC-522A	LC-511A	LC-511
Blackburn	PAC7	PAC7	PAC345	2CA	4CA
Fargo	GA-9040L	GA-9040L	GA-9020L	GA-9002L	GA-9003L
Reliable	600ALC	555ALC	438ALC	438ALC	438ALC
	AC	SR Size (Ove	r Armor Rods)		
	3/0	2/0	1/0	2	4
Alcoa	201	R197	R197	R197	199
Anderson/Sq. D	LC-833	LC-833	LC-811A	LC-811A	LC-811
Blackburn	-	-	PAC7	PAC7	PAC7
Fargo	GA-9843C	GA-9842C	GA-9040L	GA-9020L	GA-9020L
Reliable	-	-	744ALC	600ALC	600ALC

p - Connector, Distribution

Applicable Specification: ANSI C119.4

Copper Type Conductors Connections to same size or smaller

C'Weld Copper	2A		4A	6A	8A
Copper	0x7	2x3		4	6

Bare Conductor

	Anderson/Sq. D	DG-1/0	DG-1	DG-2	DG-4	DG-6
(s)	Blackburn	1/0H	1H	2H	4H	6H
(s)	Burndy	KS-25	KS-23	KS-23	KS-20	KS-17
(s)	Dossert	DS-10-F	DS-6-F	DS-6-F	DS-3-F	DS-2-F
	Fargo	GC-5020	GC-5002S	GC-5002	GC-5004	GC-5006
(s)	Greaves	-	A-8	-	A-5	A-3
(s)	ILSCO	IK-1/0	IK-2	IK-2	IK-4	IK-6
(s)	Kearney	118109	118109	118108	118104	118102
(s)	Krueger & Hudepohl	UC58C-EV	-	-	-	-
(s)	Penn-Union	S1/0	S2	S3	S4	S6
(s)	Reliable	-	1F	2F	4F	6F
	Royal Switchgear	1739	1739	-	_	_

Over Armor Rods

	Anderson/Sq. D	K-5	K-4	K-4	K-2	K-2
	Burndy	KVS-31	KVS-31	KVS-28	KVS-26	KVS-26
	Fargo	GC-5035	GC-5035	GC-5040	GC-5020S	GC-5020
	ILSCO	IKB-350	IKB-350	IKB-4/0	-	-
(s)	Kearney	118112	118112	118111	118110	118110
	Penn-Union	VT-4	VT-3	VT-3	VT-2	VT-1

(s)designates split bolt connectors

Long Connectors (Split Bolt) <u>Copper to Copper</u>

	<u>2</u>	<u>4</u>	<u>6</u>
Anderson/Sq. D	C-2-L	C-4-L	C-6-L
Blackburn	2H3	4H3	6H3
Burndy	KS-22-3	KS-20-3	KS-17-3
Dossert	DS5-3	DS3-3	DS2-3
Greaves	A-9	A-6	A-4
Kearney	118107	118105	118103
Penn-Union	SEL-3	SEL-4	SEL-6
Reliable	_	4F	6F

p - Connectors, Service (Parallel Groove)

Applicable Specification: ANSI C119.4 Aluminum-to-Aluminum Solid or Stranded

	<u>No. 2</u>	<u>No. 4</u>
Alcoa	490.0	490.0
Anderson/Sq. D	LC-51A	LC-51A
Blackburn	PAE 2121-9	PAE 2121-9
Burndy	UC25R2R	UC25R2R
Fargo	GA-9002L	GA-9002L
Penn-Union	PCAA-10BF	PCAA-10BF
Reliable/Bethea	APG-1	APG-1

p - Connectors, Service (Parallel Groove)

Applicable Specification: ANSI C119.4
Aluminum-to-Copper
Solid or Stranded

	2 A1 to <u>4 Cu</u>	4 A1 to <u>6 Cu</u>
Anderson/Sq. D	LC-511A	LC-511A
Blackburn	PAC345	PAC345
Fargo	GA-9002L	GA-9002L

p - Connectors, Service

Applicable Specification: ANSI C119.4 Copper-to-Copper Solid or Stranded

<u>Manufacturer</u>	No. 4	No. 6
Anderson/Sq. D	4E	6ES
Blackburn	4N	6N
Burndy	KP4C	KP6C
Dossert	ES-4	ES-6
Fargo	GC-5004	GC-5006
Ilsco	SX-4	SX-6
Penn-Union	SX-4	SX-6
Southport	SE-3	SE-2

p - Connectors, Guy Bond (Parallel Groove)

Applicable Specification: ANSI C119.4

ACSR to Guy Strand

	<u>2/0</u>	<u>1/0</u>	<u>2 & 4</u>
Alcoa	396.6	396.6	490.0
Anderson/Sq. 1	D LC-52A-GP	LC-51C-GP	LC-51A-GP
Blackburn	PAE 2121-9	PAE 2121-9	PAE 2121-9
Burndy	UC 28R	UCG25R	UCG25R
Dossert	AC103-LW	AC101-LW	AC100-LW
Fargo	GA-9040L	GA-9040L	GA-9040L
Penn-Union	ALC-15	ALC-10	PCA-010
Reliable	744AL	555AL	438AL

Copper to Guy Strand

Anderson/Sq.	D	LC-511A
Blackburn		K-1

Slackburn K-1

2HPW (1/4") 1/0 HPW (3/8")

Burndy UC8W26L
C & R CRJC-1
Dossert UDV 13-1-P
Fargo GC-8040P
ILSCO SK-3 (1/4")
SK-1/0 (3/8")

Joslyn J8300 Kearney 9968-1 Krueger & Hudepohl UC58B-EV Penn-Union JC-1-AC

(1/4", 3/8" guy strand) (1/0 strand copper max.)

Reliable 438ALC

p - Connectors, Compression
Applicable Specification: ANSI C119.4

DISTRIBUTION

	Aluminum to aluminum	Aluminum to copper	Copper to copper	Tap Connections (Al to Al,Al to Cu)
Anderson/Sq. D	AC Series	AC Series	VCUC	VCP
Blackburn	Type WR	Type WR	Type CF	Type WR
Burndy	"Hycrimp" (Type YH)	"Hycrimp" (Type YH)	Crimpit" (Type YC-C)	"Cabelok Crimpit" (Type YP-U)
Homac	H Tap-OB&DB	H Tap-OB&DB	CC	H Tap-OB&DB
Kearney	"Squeezeon" (Aluminum)	"Squeezeon" (Aluminum)	"Squeezeon" (Copper)	"Squeezeon" (Aluminum)
Penn-Union	"Press-On" (Aluminum)	"Press-On" (Aluminum)	"Press-On" (Copper)	"Penn-L-Tap"

NOTE: These connectors are acceptable when installed using tools and dies in accordance with the connector manufacturer's recommendations.

p - Connectors, Compression Applicable Specification: ANSI C119.4

SERVICE

	Aluminum-to-Aluminum <u>Aluminum-to-Copper</u>	Copper-to-Copper
Anderson/Sq. D	VAUS	VHS
Blackburn	CS, KL ICS-1, IKL (Insulated)	-
Burndy	"Linkits" (Type YSU, YSD) "Insulink"(ES)	"Hysplice" (Types YDS-C, YDS-W)
Homac	"Shure Splicers"	-
Kearney	"Serv-ens"	-
National Tel. Supply	"Nicopress"	-
Penn-Union	"Penn Sleeves"	-

These connectors are furnished in a variety of sizes to fit all combinations of aluminum and copper service wire.

NOTE: These connectors are acceptable when installed using tools and dies in accordance with the connector manufacturer's recommendations.

p - Connectors, Transmission Applicable Specification: ANSI C119.4

BOLTED TYPE

ACSR to ACSR ACSR to Copper



Alcoa

580 Series

Burndy (ACSR to ACSR)

UP-A, UP-R

When ordering these clamps specify size, stranding and material of both conductors.

COMPRESSION TYPE

ACSR to ACSR Same Size



Size	Alcoa	Anderson	Burndy	<u>Kearney</u>	Blackburn
1/0	5074.438	VPUS	YCS25R	OHR-1/0-61AJ	RCJ10
2/0	5074.484	-	YCS26R	OHR-2/0-61AJ	RCJ20
3/0	5075.547	Order	YCS27R	OHR-3/0-61AJ	RCJ30
4/0	5075.609	by	YCS28R	OHR-4/0-61AJ	RCJ40
266.8 kcmil	5076 Order by	Conductor	YCS30R	HR-266-267AJ	RCJ266M
336.4 kcmil	5076 stranding	Size	YCS33R	HR-336-267AJ	RCJ336M

ACSR to Copper

Alcoa 5070 Series Anderson/Sq. D VPUS

Anderson/sq. D VPUS
Burndy YCR-R-CA

(Order by conductor sizes)

NOTE: These connectors are acceptable when installed using tools and dies in accordance with the connector manufacturer's recommendations.

p - Connectors

(wedge type)

<u>Manufacturer</u>	Aluminum-to- aluminum	Aluminum-to- <u>copper</u>	Copper-to- <u>copper</u>	Tap Connections (Al to Al, Al to Cu)
AMP	"Wrench-Lok"	"Wrench-Lok"	-	"Wrench-Lok"
Burndy	WEJTAP	WEJTAP	WEJTAP	WEJTAP
Connector Products, Inc.	Aluminum Tap Connector	Aluminum Tap Connector	-	Aluminum Tap Connector

p - Connectors

Marris 6 - Abrillian	Meeting No.	gan diki an a
<u>Manufacturer</u>	<u>and Date</u>	<u>Conditions</u>
Anderson/Square D *Compression al to al al to cu "Versa-Crimp" L tap.	748 11/01/62	To obtain experience.
Parallel groove, aluminum LC-52C (1/0 - 6/1 ACSR over armor rods) LC-51C (1/0 - 6/1 ACSR)	738 06/21/62	To obtaiń experience.
Blackburn Bolted, insulated IPC 1102 (#2-1/0 run, #2 tap) IPC 4111 (1/0-4/0 run, #2-1/0 tap) IPC 4141 (1/0-4/0 run,	1327 09/11/86 1330 10/30/86	 For use on 600 volt maximum insulated conductors. To be used only for connecting service
1/0-4/0 tap)		drop conductors to service entrance conductors.
		3. To obtain experience
Homac		
*Compression, Insulated "Shure Splicers" Types Q1N and U1N	1074 09/25/75 1269 11/17/83	To obtain experience.
<pre>Kupler Bolted, insulated 130001 (#2-1/0 run, #2 tap) 130003 (1/0-4/0 run,</pre>	1306 09/26/85	 For use on 600 volt maximum insulated conductors.
#2-1/0 tap) 130004 (1/0-4/0 run, 1/0-4/0 tap)		 To be used only for connecting service drop conductors to service entrance conductors.
		3. To obtain experience
<u>Penn Union</u> *Compression, Insulated Type PIK	866 02/08/68	To obtain experience.
<u>Utilco</u> Two bolt style, al to al Type PM	1053 11/14/74	To obtain experience.

^{*}NOTE: These connectors are acceptable when installed with tools and dies in accordance with the connector manufacturer's recommendations.

q - Bolt, double upset

Applicable Specification: "REA Specifications for Single and Double Upset Spool Bolts," D-5

Diameter, inches Length, inches	5/8 <u>7</u>	5/8 <u>8</u>	5/8 <u>9</u>	5/8 10
Chance	-	7826	7828	7830
Cooper Power Systems* (Mcgraw-Edison)		DC3E11	DC3E12	DC3E13
Dixie	D7824	D7826	D7828	D783.0
Joslyn	-	J2394	J2395	J2396
Kortick	K4760	K4761	K4762	K4763
Utilities Service	31065	31067	31069	31071



^{*}Static proof" designs available.

s - Clevis, secondary swinging

Applicable Specifications: "REA Specifications for Secondary Swinging Clevises," D-6

<u>Manufacturer</u>	Clevis only*	Clevis with 1-3/4" groove spool	Clevis with 3" groove spool
Chance	0352	0352-C909-1032	0352-C909-1034
Cooper (McGraw- Edison)	DC4S1	DC4S14	DC4S13
Dixie	D0352	-	-
Joslyn	J0322	J0392	J0393
Kortick	К9259	K9109	K9149
Utilities Service	32043	36043	32143

^{*}Catalog Number does not include spool. See page cm for spool type insulators.

u - Deadend for galvanized steel or alumoweld guy strand

Toww

Chance

Continental

Flagg (MIF)

3-Bolt Guy Clamp

	Light <u>(1/2" bolts)</u>	Heavy <u>(5/8" bolts)*</u>
Chance	6450	6461
Cooper Power Systems (McGraw-Edison)	DG3C2	DG3C3
Dixie	D6450	D6461
Joslyn	J930	J931
Kortick	K4124	K4005
Util. Service	5273	5275

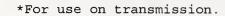


U-Bolt Guy Clamp

Light (3/8" bolts)	Heavy (1/2" bolts)
GCU38C	-
GC-64C	GC-67C
PAX-64C	PAX-67C

Offset Guy Clamp

	Light <u>(1/2" bolts)</u>	Heavy (5/8" bolts)
Chance	6409	6410
Joslyn	J926	Ј927



u - Deadend for galvanized steel guy strand

*Class B galvanizing. When guy wire has Class C galvanizing, formed deadend should also have Class C galvanizing.

7X.148" (20M) 7#8 (16M) 3#10(4M) 7#12(6M) 7#11(8M) 7#10(10M) 7X.110"(11.5M) 7#9(12.5M) 7X.121"(14M) u - Deadend for aluminum clad guy strand Strand Size

Formed Type Aluminum-Clad Guy Strand

			AWGG1125	HG528-20M	AWDE-4126	
			AWGG 0965	HG525-16M	AWDE-4122	
			AWGG 0905	HG524-14M	AWDE-4120	
		12.5M-AWTLG	AWGG0870	HG523-12.5M HG524-14M	AWDE-4119 WGL-4120	
200 400			AWGG 0825		AWDE-4118	
	51-0301	10M-AWTLG	AWGG 0770	HG521-10M	AWDE-4116 WGL-4116	
		6M-AWTLG 8M-AWTLG	AWGG 0600 AWGG 0685 AWGG 0770	HG517-6M HG519-8M	AWDE-4108 AWDE-4110 AWDE-4113 WGL-4110 WGL-4113	
	a) l	М9	AWGG 0555 A	ЭH	AWDE-4108 AW	
	Carolina Formed Wire For standard guy	<u>Chance</u> For standard guy	<u>Dulmison</u> For standard guy	Helical Line Products For standard guy	Preformed Line Products For standard guy For wrapped guy	

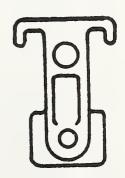
Aluminum-Clad Guy Strand

v - Guy Attachment for 5/8" bolt

Type:	Formed Strap	Angle <u>Bolt Eye</u>	Guy Hook	Guy Hook*
Maximum Working Load Rating	23,130 N (5200 lbs.)	23,130 N (5200 lbs.)	23,130 N (5200 lbs.)	37,800 N (8500 lbs.)
Anderson Elec./ Square D	-	-	-	-
Chance	5004	0100	-	GH5
Continental Electric	-	-	GAD	GAD-56-4
Cooper Power Systems	ower Systems DG6H1		DG21H1	-
			DG21H2	
Dixie	D5004	D0100	DD-9460	DD-9462
Flagg (MIF)	-	-	P151A,	P151X
Joslyn	J25164	J6500	J6555,J6556	-
Kortick	K4035,K4047	K3140	-	-
Line Hardware	-	-	-	HGA-58C
Reliable/Bethea	-	-	-	AG-5
Universal Electric	-	-	-	UGA-56C
Util. Service	31030	5531	-	-







^{*}This hook may be used in place of the wrapped guy arrangement in assemblies E3-2 and E3-3.

Pole Eye Plates (5/8" Bolt)

<u>Type</u>	Pole <u>Eye Plate</u>
Maximum Working Load Rating	37,800 N. (8500 lbs.)
Anderson Elec./ Square D	GSP-05
Atlas Power Products	APF-2025
Continental Electric	PEP-66-45
Flagg (MIF)	PX88
Line Hardware	PGA-548
Reliable/Bethea	PE5-6A
Utilities Service	PE21

v - Guy attachment

Manufacturer	Meeting No. and Date	<u>Conditions</u>
Chance Pole Band, with cone head bolt 6280, and guy clip 456 6276 (for 6" to 10" pole) 6277 (for 8" to 14" pole)	1442 03/05/92 1443 03/19/92	To obtain experience. For distribution lines only and 10,000 lbs maximum loading.
Continental Pole Band, UCB-15E	1469 06/17/93	To obtain experience. For distribution lines only and 10,000 lbs maximum loading.
<u>Joslyn</u> Pole Band, with cone head bolt J-6281, and guy clip J-6275 J-6280 (for 6" to 10" pole) J-6270 (for 8" to 14" pole)	745 08/16/62	To obtain experience. For distribution lines only and 10,000 lbs maximum loading.

w - Insulators, guy strain (Fiber Reinforced Plastic)

Ult. Strength, lbs.	11,000	15,000	21,000
Atlas Power Products	100 Series	100 Series	200 Series
<u>Continental</u>	G-11 Series	G-15 Series	G-21 Series
Dulmison	HSI1-1P Series	HSI-2X Series	HSI3-2P Series
Flagg (MIF)	150 Series	150 Series	210 Series
<u>Hughes Brothers</u>	-	692 Series	694 Series
<u>K-Line</u>	-	-	KL Series
Reliable/Bethea	FGS16 Series	FGS16 Series	FGS21 Series

x - Rod, anchor

Applicable Specification: ANSI C135.2, "Standards for

Galvanized Ferrous Strand

Eye Anchor Rods."

Applicable Sizes: Single guy

- 5/8 inch diam. 6, 7 and 8 feet long - 3/4 inch diam. 8, 9 and 10 feet long

1 inch diam. 9 and 10 feet long

- 5/8 inch diam. 7 and 8 feet long Double guy

- 3/4 inch diam. 8, 9 and 10 feet long

1 inch diam. 9 and 10 feet long

Single Guy Drive - 5/8 inch diam. 7 and 8 feet long

- 3/4 inch diam. 8, 9 and 10 feet long

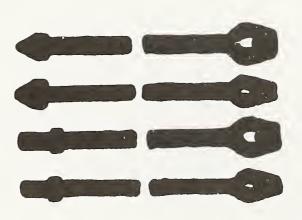
1 inch diam. 9 and 10 feet long

Double Guy Drive - 5/8 inch diam. 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

The following manufacturers have shown compliance with the applicable specifications. Some manufacturers cannot supply all sizes listed above. Check with manufacturer or distributor for availability.

> Chance Cooper Power Systems Dixie Eritech (Carolina Galvanizing/Knight)

Grip-Tite Joslyn Kortick Utilities Service



x - Rod, anchor

<u>Applicable Specification:</u> ANSI C135.2 "Standards for Galvanized Ferrous Strand Eye Anchor Rods" except rods are copper covered. Copper coating thickness is 13 mil minimum at any point and a 15 mil average. All purchases should specify that a factory certification to the thickness of the copper must accompany the shipment of the rods.

Applicable Sizes:

Double Guy - 3/4 inch diameter, 8 and 9 feet long.

<u>Manufacturer</u>	Meeting No. <u>and Date</u>		<u>Conditions</u>
Joslyn	1387 07/20/89	1.	To obtain experience.
	07/20/89	2.	For transmission purposes only
		3.	For use with log anchors or copper covered plate anchors only.
		4.	To be used with copper coated hardware or bronze hardware underground.

y - Galvanized Steel Strand

Usage: Guy, Distribution or Transmission Line

Overhead Static Wire

ASTM Specification: A 475 - For Guy Strand

A 363 - For Overhead Static Wire

Following grades/diameters of steel wire strands are preferred sizes:

For Guying

Siemens-Martin	<u> High Strength</u>	Extra High Strength Grade
Distribution Line	Dist. or Trans.	Distribution Transmission
1/4" dia.	1/4" dia.	1/4" dia. 1/4" dia.
3/8"	9/32"	9/32" 9/32"
7/16"	5/16"	5/16" 5/16"
	3/8"	3/8" 3/8"
	7/16"	7/16"

For Overhead Static Wire (Groundwire)

High Strength
3/8" dia.
7/16"

Extra High Strength Grade
5/16" dia.
3/8"
7/16"

Alcan Cable
Armco Steel Corporation
Bekaert Steel Wire Corporation
Bethlehem Steel Wire
Cal-Wire
Davis-Walker
Florida Wire and Cable
Indiana Steel and Wire
National Strand Products
Paulsen Wire and Rope Corporation
Seal Wire Company
Southwire

Note: The buyer should specify Class A, B, or C coating per ASTM A363 or A475.

y - Steel Strand

Aluminum-Clad Specifications: ASTM B415 and B416

For overhead groundwire

(Joint and splice requirements for wire and strand to meet ASTM A363) AWG Sizes: (a) 7 No. 10, (c) 7 No. 9, (d) 7 No. 8, (e) 7 No. 7 AWG

Nehring - Conex United States Alumoweld (a), (c), (d), (e) (a), (c), (d), (e)

For quy strand

(M is rated breaking load in thousand lbs) M Sizes: 6M (7 No. 12), 8M (7 No. 11), 10M (7 NO. 10), 11.5M (7 x .110"), 12.5M (7 No. 9), 14M (7 x .121"), 16M (7 No. 8), 18M (7 x .139"), 20M $(7 \times .148")$

Alumoclad de Mexico, S.A. de C.V. 8M, 10M, 16M 8M, 10M, 12.5M, 16M, 18M Nehring - Conex United States Alumoweld 6M, 8M, 10M, 12.5M, 14M, 20M

y - Al-Zn Alloy Coated Steel Wire Applicable Specification: ASTM A785 (Classes 30 & 45) Condition of Acceptance - To obtain experience

Distribution Guy Strand

Grade Siemens Martin			High Strength				Extra High Strength						
Size	1/4"	3/8"	7/16"	1/4"	9/32"	5/16"	3/8"	7/16"	1/4"	9/32"	5/16"	3/8"	7/16"
Bethleh	em												
Steel	X	X	X	X		X	X	X	X		X	X	

Transmission Guy Strand

<u>Grade</u>	High Strength			Extra High Strength						
Size	1/4"	9/32"	5/16"	3/8"	7/16"	1/4"	9/32"	5/16"	3/8"	7/16"
Bethlehem										
Steel	X			Х	X	X		X	X	X

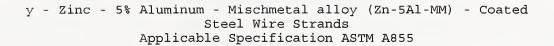
(Purchaser should specify class 30 or class 45)

y - Aluminum Coated Steel Wire Applicable Specification ASTM A474

National Strand Products, 3/8"

Distribution Guy Strand Siemens-Martin High-Strength Extra High Strength	1362 05/12/88	To obtain experience.
Transmission Guy Strand High-Strength Extra High Strength	1362 05/12/88	To obtain experience.
Overhead Static Wire High-Strength Extra High-Strength	1362 05/12/88	 To obtain experience. Must meet the joint requirements of

ASTM A363.

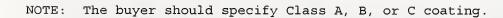


Indiana Steel & Wire Co.

Type/Grade:	Nominal	diameter	(7-wire	<u>strand)</u>	, in.

(S-M): 1/4", 3/8", & 7/16". (HS): 1/4", 9/32", 5/16", 3/8", & 7/16". (EHS): 1/4", 9/32", 5/16", 3/8", & 7/16".

Distribution Guy Strand	Meeting No. <u>and Date</u>	<u>Conditions</u>
Siemens-Martin (S-M) High-Strength (HS) Extra High Strength (EHS)	1465 04/15/93	To obtain experience.
Transmission Guy Strand		
High-Strength (HS) Extra High Strength (EHS)	1465 04/15/93	To obtain experience.
Overhead Static Wire		
High-Strength (HS) Extra High Strength (EHS)	1465 04/15/93	 To obtain experience. Must meet the joint requirements of ASTM A363.





z - Anchors, Expanding and Plate

DISTRIBUTION

Designated Maximum holding power-lbs. Min. Area - sq. in. Rod Dia inches Rod Length - feet		6000 90 5/8 7	8000 100 5/8 7	10,000 120 3/4 8	12,000 135 3/4
	Type				
Chance	8 way	88135	88135	88135	88135
Cooper (McGraw- Edison)	4 way	DA1E5	DA1E6	DA1E6	DA1E7
Dixie	4 way	D88100-G	D88115-G	D88135-G	D88135-G
	Plate	-	D7502-G	-	D7504-G
Everstick	3 way 4 way	834	836	8310 84-3/4	-
Grip-Tite	8 way	A322812G	A322812G	A322812G	A322812G
Joslyn	8 way Plate	J8100 -	J8115 J7502	J8135 J7503	J8135 J7504
Line Hardware	8 way	8-100G	8-115G	8-135G	8-135G
South Central	8 way	-	84115AG	84135AG	84135AG
Utilities Service	8 way Plate	C88100-G -	C88115-G C617-G	C88135-G C622-G	C88135-G C822-G

NOTE: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

z - Anchors, plate

Applicable Specification: "REA Specification for Steel Plate Anchors," T-3

TRANSMISSION

Minimum Area 400 sq. in.

3/4" Galv. Rods

<u>Chance</u> X24 - 3/4

Cooper Power Systems DA4P7 - 3/4 - G

(McGraw-Edison)

<u>Grip-Tite</u> XP24 - 3/4 - G

<u>Joslyn</u> J3524 - 3/4 - G

<u>Line Hardware</u> CP-24G

NOTE: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

z - Anchors, Service

Designated Maximum Holding Power in Sand - 2500 lbs.

	Screw	Expanding
Chance	6346	6870
Cooper Power Systems (McGraw-Edison)	DA2N1	-
Dixie	D-6526	-
Eritech (Carolina Galvanizing)	86346606	
Grip-Tite	-	322065G
Joslyn	J6526W-CA	J0870
Line Hardware	-	8-70G
Utilities Service	C6346-G	PL62-2.5-G

z - Anchors, Swamp

DISTRIBUTION

	10" dia.	12" dia.	<u>15" dia.</u>
Chance	10150AS	132AS	152AS
Dixie	D-6710-S	D-6713-S	D-6715-S
Foresight		MR-SR*	
Joslyn	J2871SG	J2872SG	
Utilities Service	C10150A-G	C122A-G	C152A-G

^{*}Drive type anchor. Surface area meets or exceeds that of 12" diameter anchors.

NOTE: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

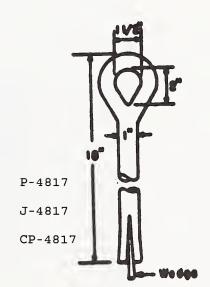
z - Anchors, Rock

	Expanding Rock	Anchors	Rock Guy Bolt	
Anchor Size - inches Rod Length - inches Rod Diameter - inches	1-3/4 15 3/4	1-3/4 30 3/4	1-3/4 53 3/4	1-3/4 18 1
Chance	R315	R330	R353	-
Joslyn	J3436	J3437	J3438	-
Kortick	K5503	K5504	K5505	K2377
Utilities Service	CR315	CR330	CR353	5003



z - Pole keys

Chance
Joslyn
Utilities Service



z - Anchors, Power-installed screw

Manufacturer:

A. B. Chance Company
"SS" Multi Helix Anchors

		Working Load Ca	tegories	
Soil	35,600 N	53,400 N	71,000 N	89,000 N
Type	(8,000 lb.)	(12,000 lb.)	(16,000 lb.)	(20,000 lb.)
A1	12642-AE	12642-AE	12642-AEJ	12642-AEJ
Soil	12642-AEJ	12642-AEJ	12642-EJN	12642-EJN
Class 2	12642-EJN	12642-EJN	12642-EJNS	12642-ENJNS
A2	12642-AE	12642-AE	12642-AEJ	12642-EJN
Soil	12642-AEJ	12642-AEJ	12642-EJN	12642-EJNS
Class 3	12642-EJN	12642-EJN	12642-EJNS	
В	12642-AE	12642-AEJ	12642-AEJ	12642-EJNS
Soil	12642-AEJ	12642-EJN	12642-EJN	
Classes	12642-EJN		12642-EJNS	
4 & 5				
С	12642-AEJ	12642-EJN	12642-EJNS	
Soil	12642-EJN			
Classes				
6 & 7				

Manufactur	er:	Joslyn		
		"PS" Screw Anchors		
		Working Load Cat	tegories	
Soil	35,600 N	53,400 N	71,000 N	89,000 N
Type	(8,000 lb.)	(12,000 lb.)	(16,000 lb.)	(20,000 lb.)
A1	J23380ACA	J23380ACA		
Soil	J23381ACA	J23381ACA		
Class 2	J23383ACA	J23383ACA		
A2	J23380ACA	J23380ACA	J23381ACA	J23383ACA
Soil	J23381ACA	J23381ACA	J23383ACA	J29726ACA
Class 3	J23383ACA	J23383ACA	J29726ACA	
В	J23380ACA	J23380ACA	J23381ACA	J29726ACA
Soil	J23381ACA	J23383ACA	J23383ACA	
Classes	J23383ACA		J29726ACA	
4 & 5				
C	J23381ACA	J23383ACA	J29726ACA	
Soil	J23383ACA			
Classes				
6 & 7				

NOTES: 1. See REA Specification T-10 for definitions and explanations.

- 2. Anchors in the 53,400 N (12,000 lb.) category or above for use on wood poles must be used with hardware commensurate with the working load. Hardware may provide for either single or multiple guy attachments to the anchor.
- 3. Anchors listed in a specific working load category and/or soil class may generally be used at lower working load categories and/or lower numerical soil classes.

z - Anchors, Power-installed screw

Manufacturer:

Dixie Electrical Manufacturing Company Multi-Helix Screw Anchors

		Working Load	Categories	
Soil	35,600 N	53,400 N	71,000 N	89,000 N
Туре	(8,000 lb.)	(12,000 lb.)	(16,000 lb.)	(20,000 lb.)
A1	D-6632	D-6632	D-6636	D-6636
Soil	D-6636	D-6636	D-6637	D-6637
Class 2	D-6637	D-6637	D-6638	D-6638
A2	D-6632	D-6632	D-6636	D-6637
Soil	D-6636	D-6636	D-6637	D-6638
Class 3	D-6637	D-6637	D-6638	
В	D-6632	D-6636	D-6636	D-6638
Soil	D-6636	D-6637	D-6637	
Classes	D-6637		D-6638	
4 & 5				
C	D-6636	D-6637	D-6638	
Soil	D-6637			
Classes				
6 & 7				

NOTES: 1. See REA Specification T-10 for definitions and explanations.

- 2. Anchors in the 53,400 N (12,000 lb.) category or above for use on wood poles must be used with hardware commensurate with the working load. Hardware may provide for either single or multiple guy attachments to the anchor.
- Anchors listed in a specific working load category and/or soil class may generally be used at lower working load categories and/or lower numerical soil classes.

z - Anchors

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
Chance Screw anchors, power installed 024462 (6,000 and 8,000 lb.) 12332P (5/8" rod) 12587 (5/8" thimbleye nut) 024484 (10,000 and 12,000 lb.) 12632P (3/4" rod) 6512 (3/4" thimbleye nut)	1453 09/03/92	To obtain experience.
<pre>Cooper Power Systems (McGraw-Edison) Screw anchors, power- installed DA11G621 (6,000 & 8,000 lb., 5/8" rod)</pre>	992 05/25/72	To obtain experience.
<pre>Dixie Screw anchors, power- installed D-1162-G (6,000 & 8,000 lb., 5/8" rod) D-1375-G (10,000 & 12,000 lb., 3/4" rod)</pre>	859 02/09/67	To obtain experience.
Foresight MR-1, MR-2, MR-3, MR-4	03/31/88	 To obtain experience. Each installation must be proof tested. Maximum rating is test value achieved.
Joslyn Screw anchors, power- installed J11B-CA (6,000 & 8,000 lb., 5/8" rod) J13C-CA (10,000 & 12,000 lb., 3/4" rod)	973 08/19/71	To obtain experience.

NOTES: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

Catalog numbers shown for screw anchors are for anchors with 1-3/8" hubs. Equivalent anchors with 1-1/2" hubs are also acceptable. (A special installing wrench is required.)

aa - Nut, eye ab - Nut, thimble eye

		aa		ab
_	Eye Nut		Eye Nut	Thimble
-	Convent 5/8"	ional 3/4"	Eyelet 5/8"	<u>Eye Nut</u> 5/8"
	5/8"	3/4"	5/8"	5/8"
American Connector Engineering			-	
Atlas Power Products	APP-1567	-EN	APP-1573-BE	APP-1575-TE
Berny's Forging Co.	OE1		-	-
Chance	6502		B14A	6510
Continental Electric	EN-5		BE-5	TN-5
Cooper Power Systems (McGraw-Edison)	DG2E3		DG6E1	DG1E1
Dixie	D6502		DD-6517	D6510
Flagg (MIF)	P125C		P127A	P128A
Hughes	EN60		-	-
Joslyn	J1092	J1093	J1126	J6510
Kortick	K4212		K4413	K3111
Line Hardware	OEN-58		BEL-58	-
Reliable/Bethea	E-5		B-5	NT-5
Utilities Service	450		497	C580

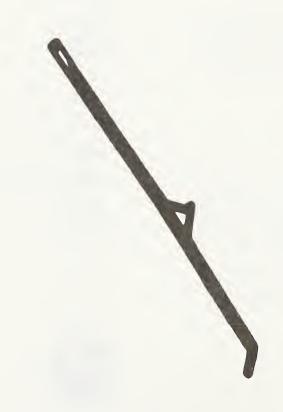






ac - Brace, sidearm diagonal

	1-1/2 inch angle 	1-3/4 inch angle 3/16" x 7'
Chance	-	6984
Cooper Power Systems (McGraw-Edison)	DB1A1	DB1A5
Joslyn	J1521	J1525
Kortick	K1951	K1954
Utilities Service	5210	5212



ae - Surge (lightning) Arrester, Distribution Class

Manufacturer	Type	Ratings, kV	Duty
ABB	LV LVBB	9/10 9/10, 18	Normal Heavy
Cooper Power Systems (McGraw-Edison)	AZL VariSTAR (MOV Type)	9, 10, 18, 27	Heavy
General Electric	Alugard	9, 10, 18	Heavy
Joslyn	Q J	9/10, 18 9/10, 18	Normal Heavy
Kearney	Unigap	9, 10, 18	Heavy

NOTE 1: Either arresters with external top gaps and without ground lead disconnectors or direct connected arresters with ground lead disconnectors may be used as specified by the user.

^{2:} All above arresters have porcelain housing.

^{3:} All above arresters are SiC type unless otherwise noted.

ae - Surge (Lightning) Arresters, Substation*

Manufacturer	<u>Type</u>	Accepted Ratings - kV	Manufacturer's Classification
ABB	LV IVL CPL	3-20 3-120 3-312	Distribution Intermediate Station
General Electric	Alugard	3, 9, 10, 18	Distribution
Joslyn	Q	3, 9/10, 18	Distribution
Kearney	Unigap	3, 9, 10, 18	Distribution
Ohio Brass DynaVar	(Metal Oxide)		
	VLA VL VN VIA VI	3-27 3-48 54-312 3-27 3-120	Station Station Station Intermediate Intermediate

NOTE: All arresters listed above are SiC type unless otherwise noted.

NOTE: All arresters listed above have porcelain housing unless otherwise noted.

* For instructions concerning application at substations, refer to REA Bulletin 65-1, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage ratings in accordance with the line voltage and the type of construction (grounded or ungrounded).

ae - Surge (Lightning) Arresters, Distribution Class

<pre>Manufacturer Type; kV Rating; Duty; (Housing)</pre>	Meeting No. <u>and Date</u> Metal Oxide	<u>Conditions</u>
ABB HMX; 9, 10, 18 kV; Heavy duty	1320 05/08/86	To obtain experience.
XPH; 9, 10, 18, 27 kV; Heavy duty; (Polymer)	1443 03/19/92	To obtain experience.
Cooper Power Systems (McGraw-Edison) AZLP; 9, 10, 18, 27 kV; Heavy duty; (Polymer) AZL500 VariGAP; Internally gapped; 9, 10, 18, 27 kV; Heavy duty	1396 01/11/87 1423 04/25/91 1483	To obtain experience. To obtain experience.
AZLP500 VariGAP, Internally gapped; 9, 10, 18, 27 kV; Heavy duty; (Polymer)	03/24/94 1423 04/25/91 1483	To obtain experience.
AZS500 VariGAP; Internally gapped; 9, 10, 18, 27 kV	03/24/94 1433 10/10/91 1483	To obtain experience.
AZSP500 VariGAP; Internally gapped; 9, 10, 18, 27 kV; (Polymer)	03/24/94 1433 10/10/91 1483	To obtain experience.
AZS VariSTAR; 9, 10, 18, 27 kV	03/24/94 1437 12/12/91	To obtain experience.
General Electric Tranquell, 9L23 Series 9, 10, 18, 27kV; Heavy duty (Polymer)	1428 07/18/91	To obtain experience.
<u>Joslyn</u> ZQ; 9, 10, 18, kV	1317 03/27/86	To obtain experience.
ZQP; 9, 10, 18, 27kV Heavy Duty; (Polymer)	1416 11/29/90 1431 09/05/91	To obtain experience.
<u>Ohio Brass</u> (DynaVar PDV, Polymer)	1334	To obtain experience.
PDV-65; 9, 10, 18 kV; (Polymer) PDV-100; 9, 10, 18 kV; Heavy duty (Polymer)	01/15/87 1386 06/29/89 1396	To obtain experience. To obtain experience.
	01/11/90	

- NOTE: 1. Either arresters with external top gaps and without ground lead disconnectors or direct connected arresters with ground lead disconnectors may be used as specified by the user.
 - All arresters listed above are normal duty unless otherwise noted.
 All arresters listed above have porcelain housing unless otherwise

noted.

ae - Surge (Lightning) Arresters, Distribution Class

Manufacturer	Meeting Noand Date	Conditions
Type; kV Rating; Duty; (Housing)	Metal Oxide	
Raychem Corporation HDA Series; 9, 10, 18, 27 kV; (Polymer)	1416 11/29/90	To obtain experience.

- NOTE: 1. Either arresters with external top gaps and without ground lead disconnectors or direct connected arresters with ground lead disconnectors may be used as specified by the user.
 - 2. All arresters listed above are normal duty unless otherwise noted.
 - 3. All arresters listed above have porcelain housing unless otherwise noted.



Manufacturer Classification Type; kV Rating; (Housing)	Meeting No. <u>and Date</u> Metal Oxide	<u>Conditions</u>
ABB Station class SMX-30; 3 thru 312 kV	1256 04/06/83	To obtain experience.
Cooper Power Systems (McGraw-Edison) Station class VariSTAR 3 thru 312 kV Intermediate class VariSTAR Type AZF; 9 thru 120 kV	1223 11/19/81 1287 09/27/84	To obtain experience.
General Electric Station class Tranquell; 2.7 thru 612 kV Intermediate class Tranquell; 3 thru 120 kV	1164 05/24/79 1197 10/09/80	To obtain experience.
<u>Joslyn</u> Intermediate class Type ZI; 3 thru 144 kV Station class Type ZS; 3 thru 240 kV	1268 10/27/83 1278 04/12/84	To obtain experience.
Station class Type ZSH; 258 thru 468 kV Intermediate class Type ZIP; 3 thru 120 kV	1341 05/14/87 1470 07/08/93	To obtain experience. To obtain experience.
(Polymer) Station class Type ZSP; 3 thru 144 kV;	1487 06/16/94 1487 06/16/94	To obtain experience.
(Polymer) Ohio Brass Station class DynaVar; 3 thru 357 kV	1175	To obtain experience.
Intermediate class	11/02/79 1239 07/29/82 1242	To obtain experience.
DynaVar; 3 thru 120 kV Intermediate class DynaVar Type PVI; 3 thru 108 kV Station class	09/09/82 1423 04/25/91 1480	To obtain experience.
DynaVar Type PVN; 3 thru 14 kV; (Polymer)	01/25/94	

NOTE: All above arresters have porcelain housing unless otherwise noted.

*For instructions concerning application at substations refer to REA Bulletin 65-1, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage rating in accordance with the line voltage and the type of construction (grounded or ungrounded).

af - Cutouts, Distribution, Open

Manufacturer	Type	Voltage Rating
ABB	ICX LBU-II	15, 27 kV 15, 27 kV
Chance	C C (loadbreak)	15, 27, 35 kV 15, 27, 35 kV
Cooper Power Systems (McGraw-Edison)	S1	15, 27 kV
Joslyn	L	15, 27 kV
Kearney	HX	15, 27 kV
Power Line Hardware/ Delmar Manufacturing Co.	DHC	15, 27 kV
S & C Electric	XS	15, 27 kV
Southern States	Series 66 Series 70	15, 27 kV 15 kV

NOTE: The buyer should specify the load rating, voltage rating, interrupting rating and required accessories.

Cutout used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

af - Cutout, open-link fuse support

Manufacturer	Mounting	12.5/7.2 kV 50_amp	24.9/14.4 kV 50 amp.
Cooper (McGraw- Edison)	Crossarm Bushing	FT1A2 FT10A3	FT1A4 -
Kearney	Crossarm Bushing	6484-55 6483-59	-

NOTE: The open link fuse supports listed above are fuse supports only and have no inherent interrupting capacity. They should be used with fuse links capable of interrupting at least 1200 amperes and for transformer protection only.

af - Power Fuses, Substation

Manufactu	rer	<u>Type</u>	Voltage Rating
ABB	RDB DBS DBA	(Boric acid, refillable) (Boric acid, non-refillable) (Boric acid, refillable)	15-34.5 15-34.5 46-69
Kearney		HX HX	15 27
S & C Elec	ctric*	XS SMD (Boric Acid)	15-25 15-138
Southern S	States	Series P	15-161

^{*}Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators $34.5\ \mathrm{kV}$ on request.

NOTE: All fuses listed on this page should be furnished with NEMA standard insulators. The buyer should specify the current rating, voltage rating, interrupting rating and required accessories.

af - Cutouts, Distribution, Open with Linkbreak Attachment

Manufacturer	Type	Voltage <u>Rating</u>	Meeting No. <u>and date</u>	<u>Conditions</u>
Chance	С	15, 27 kV	1311 12/19/85	 To obtain experience. Limited to 100 amp cutouts. To be used only with Chance, Cooper (McGraw-Edison) and Kearney fuses. Will not break S&C and some other fuse types.

ag - Fuses, Current Limiting, Backup

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
ABB 15 kV Class Type CLTX, 25K/15T 25 kV Class Type CLTX, 25K/15T	1105 01/06/77	 To obtain experience. Must be used in series with external expulsion fuse 25 K or 15 T or smaller or with CSP transformers 50 kVA or smaller.
<u>Chance</u> 15 kV Class		
Type K-Mate 25 Catalog No. C70L-31KA 25 kV Class	1084 02/19/76	Same as above.
Type K-Mate 25 Catalog No. C70L-32KA	1196 09/18/80	
Cooper Power Systems (McGraw-Edison/RTE) 15 kV Class FAH series 25 kV Class FAH series	1094 07/29/76 1454 09/24/92	Same as above.
General Electric 15 kV Class 9F59U Series 25 kV Class 9F59U	1369 09/08/88	Same as above.
High-Tech Fuses 15 kV Class No. HTDE23 (X)025 25 kV Class No. HTDE24 (X)025 35 kV Class No. HTDE25 (X)025	1290 11/29/84	Same as above.

ah - Tie, insulator, formed type

Manufacturer

Type

Carolina Formed Wire

Double support tie

(Order for specific conductor size

and insulator)

Urban tie

(Order for specific conductor size

and insulator)

Chance

Tygard Type AWTY-56* (Side tie for use over armor rod on spool insulator with

1-3/4" groove)

Super Top-Tie, Type STT for single or double support use, with insulators 2-1/4" through 3-1/2" neck diameter

and single support use on spool insulators with 1-3/4" groove diameter (Order for specific conductor size.)

Dulmison

LT "Longspan" top tie

(Order for specific conductor size

and insulator)

ST side tie

(Order for specific conductor size

and insulator)

Type SPL* (Side tie for use on spool insulator with 1-3/4"

groove)

DBST double side tie

(Order for specific conductor size

and insulator)

DST double support tie

(Order for specific conductor size

and insulator)

Helical Line Products

HTT Series

(Order for specific conductor size and

insulator).

^{*}Not for side mounting on pin or post insulators.

ah - Tie, insulator, formed type

Manufacturer

<u>Type</u>

Preformed Line Products

WT "Wraplock" (Order for specific conductor size and insulator)

ST "Groove-Formed" side tie (Order for specific conductor size and insulator)

Spool Tie for ACSR, Type SPL* (Side tie for use on spool insulator with 1-3/4" groove)

DST double support top tie (Order for specific conductor size and insulator)

DBST double side tie (Order for specific conductor size and insulator)

^{*}Not for side mounting on pin or post insulators.

ah - Tie, insulator, formed type

<u>Manufacturer</u>	Meeting No. _and Date	<u>Conditions</u>
Preformed Line Products		
EZ-WRAP* spool tie (order for specific conductor size)	1448 06/11/92	To obtain experience.

*Not for side mounting on pin or post insulators.

ai - Rods, Ground

Applicable Size: The standard length is 8 feet and catalog

numbers listed below are for this length. Longer rods may be required for special

5/8"

conditions.

Copper-covered ground rods are listed with a 13 mil minimum at any point and a 15 mil average covering of copper. All purchases should specify that a factory certification of the thickness of the copper must accompany the shipment of the rods.

Copper-covered steel rods

Apache Blackburn	588R 625813MX
Boggs	EB-810-13
Eritech (Carolina Galvanizing/Knight) Galvan	615883 6258G13
Joslyn	J8338-13
Korns Wilcor	KCG588-13 WA588C

Stainless Clad Steel

<u>Manufacturer</u>	<u>5/8"</u>	3/4"
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Teledyne (MEFCO) "PERMAGROUND" "PERMAGROUND"

ai - Rods, Ground

Applicable Size:

The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special

conditions.

Hot Dip Galvanized Steel

Manufacturer	<u>5/8"</u>	3/4"
Blackburn		GR7508
Boggs	G588 PTG588**	G348 PTG348**
Chance	8578 C203-0107** C203-0377*	8618 C203-0109**
Cooper Power Systems (McGraw-Edison)	DN5S8 DN6D8*	DN6S8
Dixie	D8578	D8618
Erico	G588	G348
	G588PT**	G348PT**
Eritech		
(Carolina Galvanizing/Knight)	815880	813480
	815889**	813489**
Galvan	GR6258	GR7508
General Electric	0982-00002	0982-00003
Grip-Tite	GT588	GT348
-	GT588PT**	GT348PT**
Joslyn	J3358B*	J3458B*
	J5328	J5338
	J5228**	J5238**
Korns	KG58	KG34
Kortick	K4658	K4678
Line Hardware	GR-588G	GR-348G
Lloyd	6258H	7508H
Porcelain Products	7338	7348
Utilities Service	5307	6338
Wilcor	WA8580G	WA8340G
Electro-0	Galvanized Steel	

Apache	G588	G348
	G588PT**	G348PT**
Blackburn	GR6258	_
Calpico	G8580	-
LMP	6258E**	7508E**

Stainless Steel

Teledyne (MEFCO)	TDY Sol	TDY Sol
Wilcor	WA 588-S	WA348-S

^{*}Rod furnished with clamp.

^{**}Rod furnished with 4 ft., No. 6 tinned or galvanized copper pigtail.

ai - Rods, ground, sectional

Galvanized steel and copper-covered steel

Copper-covered ground rods are listed with a 13 mil minimum at any point and a 15 mil average covering of copper. All purchases should specify that a factory certification of the thickness of the copper must accompany the shipment of the rods. Rods are copper-covered unless marked galvanized steel.

Sectional Ground Rods

<u>Manufacturer</u>	8' long	10' long	<u>Coupling</u>	Driving studs
Blackburn	6258S13MX	6260S13MX	60C 60CNT2*	60DS 60DSNT*
Chance Galv. Steel	C203-0052	8512	8611	-
Cooper Power Systems (McGraw-Edison) Galv. Steel	DN17S8	DN16S10	DN1K2	_
Demark	_	_	GRC 58B*	
Galv. Steel			GRC 58G*	
Eritech (Carolina Galv./Kr	night)			
Galv. Steel	635883 835880	635803 835800	CC-58* GC 58	DSH 58 DSH 58
Galv. Steel	833480	833400	de 30	DSH 34
Galvan Galv. Steel	G25GS13	6260GS13		
Galv. Steel	G25G513	6260G513	-	-
Joslyn Galv. Steel	J9158-13 J23282.8	J9160-13 J23282.10	J9182 J23282A	J9186 J9186
				22200

^{*}Threadless coupling or drive head

aj - Clamp, Ground Rod

<u>Manufacturer</u>	For 5/8" Copper- Covered Rod	For 3/4" Galv. or Stainless Steel Rod	For 5/8" Galv. or Stainless Steel Rod
AMP	_	81412-1	81412-1
Anderson	GC-5	-	-
Blackburn	G5	_	_
Boggs	G31	_	-
Burndy	GRC58	_	-
C & R Products	CRGC-58	-	-
Connector Castings	G5	-	-
Dossert	GNL62H	-	_
*Erico (Cadweld)			
1 ground wire	GR1-161G	GR1-181G	GR1-161G
2 ground wires	GT1-161G	GT1-181G	GT1-161G
Eritech			
(Carolina Galv./Knight)	CP 58	UCSS	SS 58
Greaves/Mercury	G-580	-	-
Ilsco	GRC-58	-	-
Joslyn	J8392AB	J25985	J25932
Kortick	K4647	-	-
Lew Electric Fittings	GRC-5/8"	-	-
Line Hardware	RC-58CE	-	-
Penn-Union	CEB-2	-	-
Reliable	E58	3459	3459
Wilcor	HGR5/8	WAU 5834-B	WAU 5834-B

^{*}Includes disposable molds.

aj - Clamp, ground rod

Manufacturer	Meeting No. <u>and Date</u>	<u>Conditions</u>
Burndy YGHP (for 5/8" copper- covered rods)	1234 05/13/82	To obtain experience.
Line Hardware RC-34 (for 5/8" and 3/4") galvanized or stainless steel ground rods	1114 05/12/77	To obtain experience.

al - Staples, ground wire

Applicable Specification: ANSI C135.14, "Standards for

Staples with Rolled or Slash

Points."

Length x Spread (inches)	1-1/2 x 1/4	2 x 1/2	1-1/2 x 3/8	3 x 1-1/16
Diameter	9 gauge <u>Galv. Steel</u>	8 gauge <u>Galv. Steel</u>	8 gauge <u>Copper-Coated</u>	1/4 <u>Moulding</u>
Apollo	AP521-S1672G	AP521-S1570	AP501-S6652	AP500-S6497
Chance	C205-0247	C205-0216	9167	9161
Copperweld Southe	rn	-	CP52	-
FWC	FW1672G	FW157	FW6652	FW6497
Joslyn	J1672G	J157	J6652	J6497
Kortick	-	-	K247	K236
Larson	-	350453	750233	721312
Lindsey	10248	-	-	10270
Utilities Service	88	86	48	46

Barbed staples, ground wire

Length x Spread (inches)	1-1/2 x 3/8	2 x 5/8	1-1/2 x 3/8	3 x 1-1/16
Diameter	.131 <u>Galv. Steel</u>	.165 <u>Galv. Steel</u>	.140 <u>Copper-Coated</u>	7/32 <u>Galv. Steel</u>
Apollo		AP520-57488HTG	AP501-S66525	
Joslyn	J7656	J7672	J7682	J7664

Staples, alumoweld

Length x Spread (inches) Diameter	2 x 1/2 <u>8 gauge</u>	1-1/2 x 3/8 <u>8 gauge</u>	3 x1-1/16 1/4 moulding
Apollo	AP531-S6655AL	AP531-S6652AL	AP530-S7493AL
Joslyn	-	J6652AL	J-7493AL

Clip, ground wire

Kearney 12326

al - Staples, Ground Wire

Clip, Ground Wire

Meeting No.
and Date
Conditions

Fastex (ITW)
No. 780-2
1038
04/04/74
To obtain experience.

an - Transformers, distribution, pole type Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

Applicable Specifications: "REA Specifications for Rural Distribution Transformers," D-10

Listing is by type rather than by catalog number because of the many possible combinations of voltage, kVA and taps and protective equipment.

	7.2/12.5 & <u>7.62/13.2</u>	14.4/24.9	Dual <u>Voltage</u>
ABB Conventional, single bushing Self-protected, single bushing Conventional, two bushing	S-B3 CSP-B3 S-A	S-B3 CSP-B3 S-A	S-B3 CSP-B3 S-A
Type S-B3 may also be obtained with internal fuse, with internal fuse and double gap, and with lightning arrester and open link cutout (Type PC).			
Arkansas Electric Cooperative Conventional, single bushing	ASE		
Central Moloney Conventional, single bushing Conventional, two bushing Self-protected, single bushing The single bushing transformer may also be obtained with bushing mounted cutout and lightning arrester, and with internal fuse and double gap.		AOD AOD DVP	AOD AOD DVP
Cooper Power Systems Conventional, single bushing Self-protected, single bushing Conventional, two bushing Conventional single bushing type may also be purchased with external	REA-Conv REA-CSP REA-Conv	REA-Conv REA-CSP REA-Conv	REA-Conv REA-CSP REA-Conv

overload protection and double gap and with bushing mounted cutout and

lightning arrester.

an - Transformers, distribution, pole type Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	7.2/12.5 & <u>7.62/13.2</u>	14.4/24.9	Dual <u>Voltage</u>
ERMCO Conventional, single bushing Conventional, two bushing Self-protected, single bushing	CONV	CONV	CONV
	CONV	CONV	CONV
	CSP	CSP	CSP

The single bushing transformer may also be obtained with double gap and internal fuse (Type DG) or lightning arrester and external pe COLA).

Dead-front for use in enclosure: Add "R" (Radial) or "LF" (Loop feed) to designation.

General Electric

CHOIGE DECOCEE			
Conventional, single bushing	HS	HS	HS
Self-protected, single bushing	HSBA	HSBA	HSBA
Conventional, two bushing	HS	HS	HS

Type HS may also be obtained with internal fuse, with internal fuse and double gap, with bushing mounted cutout and double gap, and with bushing mounted cutout arrester (Type HSCA).

<u>Howard Industries</u>

Conventional, single bushing Conventional, two bushing Self-protected, single bushing	REC-C	REC-C	REC-C
	Conv-2B	Conv-2B	Conv-2B
	REC-P	REC-P	REC-P
Kuhlman Conventional, single bushing	I	I	I

Н

В

Н

В

Н

Type I may also be purchased with internal fuse, with internal fuse and double gap (Type G), and with bushing mounted cutout and lightning arrester (Type J).

Conventional, two bushing

Self-protected, single bushing

an - Transformers, distribution, pole type Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	7.2/12.5 & <u>7.62/13.2</u>	14.4/24.9	Dual <u>Voltage</u>
Magnetic Electric Conventional, single bushing Conventional, two bushing Self-protected, single bushing	AOD AOD AOD	AOD AOD AOD	AOD AOD AOD
Sesco Conventional, single bushing Self-protected, single bushing Conventional, two bushing	RU ESP CONV		
Type RU may also be purchased with internal fuse and/or lightning arrester.			
United (Ky. AEC) Conventional, single bushing Conventional, two bushing Self-protected, single bushing	SC SC SCP	SC SCP	DSC DSC DSCP

SC and DSC may be purchased with external fuse and arrester (SP and DSP)

<u>VanTran</u>

Conventional, single bushing	CR
Self-protected, single bushing	CSP-R
Conventional, two bushing	CD

an - Transformers, Power Single-Phase, Step-Down for Distribution Substation Use

Applicable Specification: REA Specification for Step-Down Substation Transformers, S-3

Transformers with 115 kV and 138 kV primary voltage ratings are acceptable with full BIL and with one step reduced BIL.

"X" indicates that acceptable test data have been furnished REA for this rating and for secondary voltages in either 15 kV or $25~\mathrm{kV}$ class.

All acceptances are based on standard impedances, taps, winding designs, materials and accessories. Variations should not be ordered except under special circumstances. Complete design tests should be specified for special designs.

Primary <u>Voltage-kV</u>	-,					kV	kVA Capacity	acity		:				
	167	250	333	200	833	1250	1667	2500	3333	2000	6667	8333	10,000	
ABB														
34.4 43.8 67.0 115					***	×××	×××	×××	×××		×			
Central Moloney														
34.4	×	×	×	×										
Cooper Power Systems (McGraw-Edison)	lison)													
34.4 43.8	×	×	×	××	××	××	××							
67.0			×		×	×	×							
General Electric														
34.4 43.8 67.0 115 138	×	×	×	×	×××	×××	×××	×××	×××	××	××	×	×	

an - Transformers, Power Single-Phase, Step-Down for Distribution Substation Use

kVA Capacity	<u>167</u> <u>250</u> <u>333</u> <u>500</u> <u>833</u> <u>1250</u> <u>1667</u> <u>2500</u> <u>3333</u> <u>5000</u> <u>6667</u> <u>8333</u> <u>10,000</u>		× ××× ××× ×××		××× ××× ×××		×
Primary Voltage-kV		Hevi Duty	34.4 43.8 67.0 115	Kuhlman	34.4 43.8 67.0 115	MajneTek Electric	34.4 43.8

an - Transformers, Power Three-Phase, Step-Down For Distribution Substation Use

	30					××
	25	× ××		×		×××
	20	×××				× × ×
MVA	15	××××		××		×××××
	12	××××		××××		****
	10	××××	m	×××	Cooper	××××
	7.5	××××	ısing ABB	×××	using Cod	××××
	ıνl	×××	mers u	×××	mers u	××××
			transformers using		transformers using	
	3750	×××	changing	×××	changing t	×××
	2500	×××	tap ch	×××	tap ch	×××
			load		load	
4	2000	×××	sed as Jers.	×××	ed as	×××
kva	<u> </u>	×××	accepted of changers	1	accepted changers.	
	1500	AAA	larger also a UVW load tap cGraw-Edison)		also tap	
	1000	×××	5 MVA and larger UTT-B and UVW loa Svstems (McGraw-E	×××	large 50C los	×××
	750	×	VA and -B and tems (M		VA and and 54	. ***
- 1	7			1	mers 5 M 0, 550B, Electric	
	Primary Voltage-kV	ABB 34.4 43.8 67.0 115 138	Transformers Types UTS-A, Cooper Power	41000	Transformers 5 MVA and larger Types 550, 550B, and 550C load General Electric	34.4 43.8 67.0 115 138

Transformers 5 MVA and larger also accepted as load tap changing transformers using General Electric Types LR72, LR65 and LRT-200 load tap changers.

an - Transformers, Power Three-Phase, Step-Down For Distribution Substation Use

			kvA							MVA				
Voltage-kV	750	1000	1500	2000	2500	3750	ισį	7.5	10	12	15	<u>20</u>	25	30
Hevi-Duty														
34 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		××	× ×		× ×	***	***	****	****	****	××××	×××	× ×	
Transformers 5 MVA and larger Type UZE and Reinhausen RWT-1	IVA and inhausen	larger a RMT-1 1	also accepted as load tap changers	epted as load changers.	tap changing	ging transformers	mers using	ng ASEA						
Kuhlman														
34.4 43.8 67.0					×××	×××	***	***	××××	× ××	××××	×××	× ×	
138							×	* ×	×	×	×	×	4	×
Transformers 5 MVA and larger also accepted Types TLS and TLH-21 load tap changers.	VA and : نH-21 اود	larger a ad tap c	ilso accept hangers.	ed as load	tap changing	ging transformers	mers using		Siemans-All	٠ <u>۲</u>				
MagneTek Electric	의													
34.4							×	×	××	×	×			
67.0 115 138					×	×	×××	×××	×××	×××	××	××	××	×××
Transformers 5 N	5 MVA also accepted	accepte	as load	tap changir	ng transfo	tap changing transformers using ASEA Electric Type UZD	ASEA Elec	tric Ty	/pe UZL	load	tap ch	changers		

Transformers 5 MVA and larger also accepted as load tap changing transformers using North American type TC-525 load tap changers.

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North American Transformer

67.0 115 138

an - Transformers, Distribution, Pole Type

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
ABB 7.2/12.5, 7.62/13.2 14.4/24.9 kV & Dual Voltage		
Single-phase, single bushing, 25 and 50 kVA pole type distribution transformers with	1333 12/18/86	To obtain experience.
amorphous metal cores.	1354 12/31/87	To obtain experience.
Single-phase, single bushing and two-bushing with internal UMX Under-oil Arrester or with internal "Tranquell" Under-oil Arrester.	1395 12/18/89	To obtain experience.
Cooper Power Systems 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage		
Single-phase, single bushing, self-protected, with Magnex Interrupter	1358 03/03/88	To obtain experience.
Above or Conventional, single or two bushing; Type REA Conv. or Self-protected, single bushing Type REA-CSP with Type AZU, MOV, heavy-duty under-oil arrester.	1444 04/09/92	To obtain experience.
Ermco 7.2/12.5 and 7.62/13.2 and 14.4/24.9 kV Single-phase, single bushing with internal Tranquell Under-oil Arrester	1359 03/17/88 1362 05/12/88	To obtain experience.

an - Transformers, Distribution, Pole Type

Manufacturer	Meeting No. _and Date	Conditions
General Electric 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage		
Single-phase, single bushing, and two bushing with internal Tranquell under-oil arrester	1316 03/06/86	To obtain experience.
Single-phase, single bushing and two bushing, 10 - 50 kVA pole type distribution transformers with amorphous metal cores	1320 05/08/86 1418 01/31/91	To obtain experience.
Single-phase, single bushing and two bushing pole type distribution transformers with G.E. high voltage switch	1370 09/22/88	To obtain experience.
Howard Industries 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage		
Single-phase, single bushing, and two bushing with internal "AZU" or "Tranquell" under-oil arrester	1473 09/23/93	To obtain experience.
Single-phase, single bushing, and two bushing; 5 - 50 kVA; with or without taps, with amorphous metal cores	1479 12/16/93	To obtain experience.
<u>Kuhlman</u> 7.2/12.5 kV and 7.62/13.2 kV Toroform design 10, 15, & 25 kVA	1370 09/22/88	To obtain experience.
NECO 7.2/12.5 kV and 14.4/24.9 kV Single-phase, two bushing, 10-50 kVA, Conventional	1444 04/09/92	To obtain experience.
Prolec S.A. de C.V. 14.4 kV; 10 through 50 kVA Conventional & self-protected	1484 04/14/94	To obtain experience.
<u>VanTran</u> 14.4/24.9 kV and Dual Voltage	1075 10/16/75	To obtain experience.
Conventional, single bushing	10, 10, 10	
Type CR Conventional, two bushing Type CD Self-protected, single bushing Type CSP-R	1095 08/11/76	To obtain experience.

Conditional List an(2.1) July 1994

an - Transformers, Power Single-Phase, Step-Down For Distribution Substation Use

ror Distribution Substation Use Condition of Acceptance: To obtain experience.

Transformers with 115 kV and 138 kV primary voltage ratings are acceptable with full BIL and with one step reduced BIL.
"X" indicates that acceptable test data have been furnished REA for this rating and for secondary voltages in either 15 kV or 25 kV or

"A" indicates that acceptable or class. "s" indicates that performance	ble tes ance sp	st data ecific	nave rations	been rui have be	rnished en furn	KEA IOT lished RI	rest data have been lurnished kEA lor this rating and lor specifications have been furnished REA and test data are	cing and est data		condary to be submi	secondary voltages in either 15 kV to be submitted when available.	ın eith n avail		ő
							kVA Capacity	acitv						
Primary Voltage-kV	167	250	333	200	833	1250	1667	2500	3333	2000	6667	8333	10,000	
ABB														
34.4 43.8 67.0									տ տ տ	ത ത ത				
Cooper Power Systems (McGraw-Edi	aw-Edis	(son)												
34.4 43.8 67.0	w w	w w	W	w			w	លលល	տ տ տ		លលល	លលល	w w w	
Delta-Star														
34.4 43.8 67.0 115	$\omega \Join \Join$	տ տ տ	$\omega \Join \Join$	$\omega \Join \Join$	× w w	× w w	w w w w	× w	w	W	w	w	W	
ESCO														
34.4	×			×	×									
Ferranti-Packard														
67.0		Ø	Ø	Ø	Ø	×	Ø	Ø	Ø					
General Electric														
43.8 115										w		w	w	
Hevi-Duty														
34.4 43.8 67.0 115									w	លលលល	ω ω ω ω	ww w	លលលល	
MagneTek														
67.0							Ø							

an - Transformers, Power Three-Phase, Step-Down for Distribution Substation Use

			΄χ	Cond. kVA	Condition of		Acceptance:	To ob	To obtain ex	experience.	ıce. MVA				
Primary <u>Voltage-kV</u> ABB	750	1000	1500	2000		2500	3750	ωl	7.5	10	12	15	20	25	30
34.4 43.8 67.0 115	ത ത							യ യ	Ø	Ø	Ø	Ø	ത ത	ശ ശ	000000
Transformers 5 M Types UTS-A and	VA and UVW 10	5 MVA and larger and UVW load tap		epted.	as load	d tap	changing		transformers	using	ABB				
Cooper Power Sys	Systems ((McGraw-Edison)	dison)												
34.4 43.8 67.0 115 138	លេលេ		w w w	w				Ø	w	w w	w	ത ത ത	000000	מ ממ מ	ល ល ល ល ល
Transformers 5 MVA a Types 550, 550B and	VA and and 550	and larger 550C load	also accepted tap changers.		as load	d tap	changing transformers	transf		using	Cooper	()			
Delta Star															
34.4 43.8 67.0 115 138	w	w w	ស ស ស	מ מ	ທ ທ ∺		***	$\times\!\times\!\times\!\times\omega$	$\times \times \times \times \omega$	w w × w w	×××	$\bowtie \bowtie \omega$	w	Ø	w
Transformers 5 MVA and Types TLS, TLH-21 load	VA and 1 load	larger tap cha	also ac ingers.	also accepted angers.	as load	d tap	changing		transformers	using		Seimens-Allis	s L		
Federal Pioneer (Groupe Schneid	der)														
115												×			
Ferranti-Packard															
34.4	തത	ហ ហ	ഗ ഗ	ത ത	× m		ത ത	თ ×	Ø	v					

an - Transformers, Power Three-Phase, Step-Down for Distribution Substation Use

Condition of Acceptance: To obtain experience.

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	25	ທຸທ			ത തത						ഗ			
	20	w w	Electric		w w						w	ric		
MVA	15				Ø						Ø	Electric		
M	12		g General			y ASEA			y ABB			y ASEA		
	10		s using			usine		ល ល ល	s using			s using		
	7.5	w	transformers using			transformers using		w w×	transformers using			transformers using		
}	ហ្				w			w w×						×
	3750		changing			changing		$\times \times$ ω	changing			changing		×
			tap cl			tap cl			tap cl			tap cł		
	2500		s load taps.		w	load s.		w × w	load			load		ល
	2000		oted as nangers		യ യ	accepted as load tap changers.			oted as			oted as		ហ
kVA	1500		accer tap cl		w				also accepted changers.			accepted		ហ
			er also load		0 1	er also 1 load						er also		VI
	1000		l large .RT-200		Ø	l larger en RMT-1			l larger load tap			l larger Igers.		ល
	750	ı	MVA and 5 and I		w w	5 MVA and Reinhausen			MVA and UTT-B	ic		5 MVA and tap chan		Ø
	<u>kV</u> Electric		ers 5 2, LR6						ers 5 -A and	Electri		ers 5 load ta		
	Primary <u>Voltage-kV</u> General El		Transformers 5 MVA and larger also accepted as Types LR72, LR65 and LRT-200 load tap changers	Hevi-Duty	34.4 43.8 67.0 115 138	Transformers Type UZE and	MGM	34.4 43.8 67.0	Transformers 5 MVA and Types UTS-A and UTT-B 1	MagneTek	115	Transformers 5 MVA and lar Type UZD load tap changers	Uptegraff	34.4

Conditional List an(4) July 1994

an - Transformers, Step Ratio, Single Phase,
Autotransformers or Two-Winding Transformers
 for Use in System Voltage Conversion

Condition of Acceptance: To obtain experience.

Manufacturer	<u>Designation</u>	Size
<u>ABB</u>		
2 - WND	"Jumbo"	167-500
Central Moloney 2-WND	AOD	167-500
Cooper Power Systems 2-WND AUTO	"Round-Coil" MEPS-AUTO	167-500 167-1000
Delta Star 2-WND AUTO	LTD LTD-A	167-500 167-1000
General Electric 2-WND AUTO	HS STEP HS STEP	167-500 167-1000
<u>Howard Industries</u> 2-WND	STEPS	167-500

NOTE: Two-winding transformers are self-protected under external short circuit in accordance with ANSI C57.12.90A. Auto-transformers will withstand 25 times rated current under external short circuit in accordance with ANSI C57.12.90A.

ao - Bolt, strand eye, straight (thimble eye)

Applicable Specification: ANSI C135.4, "Standards

for Galvanized Ferrous Eye Bolts and Nuts for

Overhead Line Construction."

Applicable Sizes : 5/8 inch, 6 through 12 inch

length 3/4 inch, 8 through 12

inch length

The following manufacturers have shown compliance with the applicable specification:

A. B. Chance Company

*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company

Joslyn Mfg. and Supply Company Kortick Manufacturing Company Utilities Service Company

*"Static proof" designs available.



ap - Clamp, hot line Copper and Copperweld-copper Conductor (Clamps with internal springs and enclosed threads)

<u>Conductor</u> Copper Copperweld-copper	6 thru 2/0 8A thru 2A
Anderson Blackburn Chance Fargo	BC-2/0 HLC 2108 S1520CC GH-100 (For use with CL Fuse, order GH-201)
Ideal Penn-Union	3532 HLC-020-LS

ap - Clamp, hot line
ACSR with armor rods

Clamps listed below have spring action and enclosed thread chambers.

Conductor Size		4/0 & 3/0	2/0	1/0 & 2	4
	Tap <u>Conductor</u>				
Anderson	Aluminum Copper	AC-800 AC-800-GP	AC-500 AC-500-GP	AC-500 AC-500-GP	AC-500 AC-500-GP
Chance	Aluminum Copper	S1540-AA S1540-AC	S1540-AA S1540-AC	S1530-AA S1530-AC	S1530-AA S1530-AC
Connector Mfg.	Aluminum	HL 4/0			
Fargo	Aluminum Copper	GH-202AL GH-102AC	GH-202AL GH-102AC	GH-101A GH-101AC	GH-101A GH-101AC
Penn Union	Aluminum Copper	-	-	HLCA-040 HLCA-040	HLCA-040 HLCA-040
Utilco	Aluminum	-	HLC-397	-	HLC-40

ar - Wireholder

Applicable Specification: "REA Specification for Service Wireholders," D-15

	With #22 Wood Screw	With 3/8" x 5" Bolt
Blackburn	SW3	-
Chance	3-11-44	-
Cooper Power Systems (McGraw-Edison)	DW2R9	-
Dixie	D3-11-44	-
Joslyn	J089	-
Porcelain Products	1986	-



NOTE: For Triplex type service cable see clevis type wireholders on page bt-1.

ar - Wireholder
(with #22 wood screw)

Meeting No.

Manufacturer and Date

 Joslyn
 1480

 J089Z
 (nylon alloy)
 01/25/94

Conditions

To obtain experience.

as - Clevis, service swinging

Applicable Specifications: "REA Specifications for Service Swinging Clevises," D-7

	Clevis Only*	Clevis with Wet Process Spool	Clevis with Dry Process Spool
Chance	1948C	1948C-C909-1031	1948C-0606
Cooper Power Systems (McGraw-Edison)	DC7S2	-	-
Dixie	D1938	D1938-C	D1948-C
Joslyn	J1614	-	J1615
Kortick	K9260	K9141	K9142
Utilities Service	32003	31003	31004

^{*}Catalog number does not include spool; for spool insulators see Item cm.

at - Guy Marker, 8 Foot Length

SteelManufacturerFull RoundHalf RoundCooper Power Systems (McGraw-Edison)DG15G1DG5G3JoslynJ1618J1528KortickK3729-

at - Guy Marker 8 Foot Length Plastic or Fiberglass

Manufacturer	Catalog Number
Auburn Extrusions	TK-808 (Yellow) (with bolt type clamp)
Chance	96-PBG-2 (Gray) 96-PBG-2Y (Yellow) 96-PBG-2ORG (Orange)
Chance*	96-FRPMR-GRY (Gray) 96-FRPMR-YEL (Yellow) 96-FRPMR-ORG (Orange) 96-FRPMR-GRN (Green)
Custom Plastics	CPUGGSH
Dulmison*	HGG-OL8Y-C (Yellow)
Electrical Materials*	70-7G (Gray) 70-7Y (Yellow) 70-7O (Orange)
Joslyn	J1491Y (Yellow) J1491G (Gray)
Joslyn*	J5518 (Yellow) J5508 (Gray)
Mangrum	R-8-Y
Preformed Line Products*	PG-5508 (Gray) PG-5518 (Yellow)
Radar*	6032B (Yellow)
Vaughn*	003-7140 (Gray) 004-7140 (Yellow) 005-7140 (White)
Virginia Plastics*	TG-137-8G (Gray) TG-137-8Y (Yellow)
Virginia Plastics**	FG-8G (Gray) FG-8Y (Yellow)

^{*} For use with formed or automatic type deadends for guy strand; will not fit over bolt type guy clamps.

^{**} Available with either 1 or 2 bolt clamps.

at - Reflective Guy Marker, 8-foot length

Plastic or Fiberglass

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	<u>Conditions</u>
*Nordic HG-815 yellow	1061 03/20/75	To obtain experience.

^{*}For use with formed or automatic type deadends for guy strand; will not fit over bolt type guy clamps.

av - Conductor, ACSR

Applicable Specification: ASTM Specification B 232

Preferred Sizes: (Larger sizes	Distribution 4 - 6/1	<u>Transmission</u> 1/0 - 6/1
	· .	•
may be used where	4 - 7/1	2/0 - 6/1
the engineer's	2 - 6/1	3/0 - 6/1
study shows they	2 - 7/1	4/0 - 6/1
are required.)	1/0 - 6/1	266.8 kcmil - 26/7
	2/0 - 6/1	336.4 kcmil - 26/7
	3/0 - 6/1	477 kcmil - 26/7
	4/0 - 6/1	556.5 kcmil - 26/7
	266.8 kcmil 18/1	795 kcmil - 26/7
	336.4 kcmil 18/1	954 kcmil - 54/7
	477 kcmil 18/1	

The following manufacturers have shown compliance with the applicable specifications:

ACPC, Inc.

Alcan Cable

Alcatel Canada Wire

Cablec

Condumex

Nehring

Noranda

Pirelli Cable

Southwire

- 1. Conductors with 18/1 stranding have different sag characteristics than conductors with 6/1 or 26/7 stranding. This difference in sag characteristics must be taken into consideration in the line design.
- 2. 266.8 kcmil 26/7, 336.4 kcmil 26/7, and 477 kcmil 26/7 may be used for distribution underbuild on transmission lines.

av - Conductor, copper

Applicable Specifications: ASTM Specification B1-81 (or latest

revision) for hard-drawn solid ASTM Specification B8-81 (or latest revision) for hard drawn stranded

and soft stranded

ASTM specification B3-74(80) (or latest revision) for soft or

annealed solid.

Preferred Sizes: Hard-drawn solid 4 and 6

Soft or annealed solid 4 and 6 Hard-drawn stranded 2x3, $1/0 \times 7$, $2/0 \times 7$

Soft stranded 4 and 6

The following manufacturers have shown compliance with the applicable specifications:

Cablec

Condumex

General Cable

Nehring

Republic Wire

Rome Cable

Seal Wire Company

Service Wire Company

Southwire

av - Conductor, Copperweld-copper

Applicable Specification: ASTM Specification B 229

Preferred Sizes:	<u>Distribution</u>	<u>Transmission</u>
	8A	1/0 F
	6A	2/0 F
	4A	3/0 F
	2A	4/0 F

The following manufacturers have shown compliance with the applicable specification for the sizes indicated:

Copperweld Southern (All sizes)

Southwire (2A and smaller)

av - Conductor, Service (Single Conductor)

<u>Manufacturer</u>	Aluminum	<u>Copper</u>
Alcan Cable	x	
Alcatel Canada Wire	x	
Cablec	x	x
Condumex	x	x
Nehring	x	
Pirelli Cable	x	x
Rome Cable	x	x
Southwire	x	x

Applicable Specification: ICEA-NEMA Standard S-66-524

Insulation: Cross-linked thermosetting polyethylene or equal.

Conductor: MHD copper or HD (Aluminum 1350) aluminum

(Compact or compressed stranded conductor is acceptable.)

Marking: Manufacturer's name and type of insulation shall be clearly

shown in durable markings on the surface of the insulation

at intervals no greater than 24 inches.

av - Conductor, Service Cable (Triplex and Quadruplex)

<u>Manufacturer</u>	Aluminum	Copper
ACPC, Inc.	x	
Alcan Cable	x	
Alcatel Canada Wire	x	
Cablec	x	x
Condumex	x	x
Hendrix	x	x
Nehring	X	
Pirelli Cable	x	x
Rome Cable	X	x
Southwire	x	x

Applicable Specifications: REA Specification D-2, Specifications for 600 Volt Neutral-Supported Secondary Service Drop Cables.

av - Conductor, Aluminum Alloy

Applicable Specification: ASTM Specification B399

Preferred Sizes:

DISTRIBUTION 6201	ACSR Equiv.	<u>6201</u>	TRANSMISSION	ACSR Equiv.
48,690 cmil - 7 str.* 77,470 cmil - 7 str.* 123,300 cmil - 7 str. 155,400 cmil - 7 str. 195,700 cmil - 7 str. 246,900 cmil - 7 str.	4 2 1/0 2/0 3/0 4/0	155,400 195,700 246,900 312,800 394,500 559,500 652,400	<pre>cmil - 7 str.** cmil - 7 str.** cmil - 7 str.** cmil - 7 str. cmil - 19 str. cmil - 37 str.</pre>	1/0 2/0 3/0 4/0 266,800 cmil 336,400 cmil 477,000 cmil 556,500 cmil 795,000 cmil

The following manufacturers have shown compliance with the applicable specifications:

<u>Manufacturer</u>	<u>Type</u>
ACPC, Inc.	6201
Alcan	6201
Cablec	6201
Southwire	6201

^{*}Not recommended for multiphase lines with span lengths exceeding 300 ft.

^{**}Not recommended for suspension type construction.

av - conductor

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
ACPC, Inc. 795 kcmil 26/7 ACSR/AW T-2 type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1247 11/18/82 1471 07/22/93	To obtain experience. 1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations.
Alcan Cable Duplex type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1482 03/03/94	 To obtain experience. Conductor handling and installation shall be in accordance with manufacturer's recommendations.
Cablec T-2 type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1488 06/30/94	 To obtain experience. Conductor handling and installation shall be in accordance with manufacturer's recommendations.
Copperweld Southern Alumoweld-aluminum 6/1 ACSR/AW, #2, #1/0, #2/0, #4/0 4/3 AWAC, #4, #2, #1/0	863 04/13/67 984 02/02/72 1376 01/12/89	To obtain experience.

aw - Washer, Spring

1/4" x 1-3/4" x 3-1/2"

	Bolt	Size	
<u>Manufacturer</u>	5/8"	3/4"	7/8"
Chance	3540	3541	
Cooper Power Systems (McGraw-Edison)	DF17W3	DF17W4	DF17W5
Flagg	F130	F132	F134
Joslyn	J3540	J3541	J3542
Kortick	K2909		
Line Hardware	SCW-58	SCW-34	SCW-78

ax - Cutout and Arrester, Combination

4.4 kV 27 kV	3¢ Bank 3¢ Sect. 1¢ Sect.3 100	1	24.9 NCX/ 18 LVG 24.9 LBU-II/ 18 LVG	C7 Series	AFZS518D Series	9F80	425703-198Q J9267-Q2/B	KE7BD109E-110
For 24.9Y/14.4 kV	1¢ Trans. 50*				AFZS110M018	9F78A	J9268-1Q	F 294074
6 kV	3¢ Bank 3¢ Sect. 1¢ Sect.		15 NCX/ 10 LVG 15 LBU-II/ 10 LVG	C7 Series	AFZS510C Series	9F80	415402-09Q J9237-Q2/B/R	KE4AB110E-110
For 13.2Y/7.6 kV 15 kV	1¢ Trans. 50*	Catalog Numbers			AFZS110M010	9F78A	J9238-1Q	294073
15 kV	3¢ Bank 3¢ Sect. 100	Catalo	15 NCX/ 10 LVG 15 LBU-II/ 10 LVG	C7 Series	AFZS510C Series	9F80	415402-09Q J9237-Q2/B/R	KE3AB110E-110
For 12.5Y/7.2 kV 7.8 kV	1¢ Sect.		7.8 NCX/ 9 LVG 7.8 LBU-II/ 9 LVG	C7 Series	AFZS510B Series	9F80	415402-09Q J9237-Q2/B	
For	1¢ Trans. 50*				AFZS110M010	9F78A	J9238-1Q	294072
Noltage		Type Mounting	Crossarm Crossarm (L)	Crossarm Transformer	Crossarm (L)	Crossarm (L) Transformer	Crossarm Crossarm (L) Transformer	Crossarm Transformer
Nominal System Voltage Cutout Max. Voltage Rating	Application Cutout Current Rating	Manufacturer	ABB	Chance	Cooper Crossarm (L (McGraw-Edison)Transformer	General Electric	Joslyn (valve) (valve) (valve)	Kearney

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

^{*}These cutouts have open links and must not be used where fault currents are high or for sectionalizing.

⁽L) Indicates loadbreak type is available.

Manufacturer

Almetek Industries, Inc.

Premax Products

Tech Products

<u>Catalog No.</u>

"E-Z Tags" Order by description

1523

Everlast Tag

ba - Bolt, Angle Eye

Thimble Type

Applicable Specification: ANSI C135.4, "Standards for

Galvanized Ferrous Eye Bolts and Nuts for Overhead Line

Construction."

Applicable Sizes : 5/8 inch, 6 through 12 inch length

3/4 inch, 8 through 12 inch length

The following manufacturers have shown compliance with the applicable specifications:

A. B. Chance Company

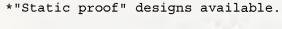
*Cooper Power Systems (McGraw-Edison)

Dixie Electrical Manufacturing Company

Joslyn Mfg. and Supply Company

Kortick Manufacturing Company

Utilities Service Company





bb - Brace, sidearm vertical

	26" brace 24" bolt-hole spacing	50" brace 24" bolt-hole spacing
Cooper Power Systems (McGraw-Edison)	DB1V1	DB1V3
Dixie	D6986	D6987
Joslyn	J1536	J1537
Kortick	K1931	K1932
Utilities Service	5249	5250

be - Reclosers, oil and vacuum

<u>Mfr</u>	<u>Phases</u>	Type	Circuit <u>Voltaqe</u>	Continuous Rating	Int. <u>Rating</u>	Oil/ <u>Vacuum</u>	Hydraulic/ Electronic
Cooper	1	Н	12.5/7.2	5-50	1250	0	Н
(McGraw-	1	4 H	12.5/7.2	5-100	2000	0	H
Edison)	1	L	12.5/7.2	25-100	4000	0	H
	3	6H	12.5/7.2	5-100	2000	0	H
	3 3	W	12.5/7.2	100-560	10,000	0	H
	3	WE	12.5/7.2	560	10,000	0	H
	3	VSA-12	12.5/7.2	100-560	12,000	V	E
	1	E	24.9/14.4	5-100	2500	0	H
			available hase opera	with shunt tion)	lockout	solenoid	for
	1	4E	24.9/14.4		4000	0	H
	1 3 3	WV	34.5/19.9		8000	0	H
	3	WVE	34.5/19.9	560	8000	0	E
Lexington Switch and		A Line Model B	12.5/7.2	5-50	1250	0	H
Controls	1	A Line Model D	12.5/7.2	25-100	2000	0	H
	1	A Line Model K	•	25-100	4000	0	Н

- 1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
- 2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, oil circuit 12.5/7.2 kV

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	<u>Conditions</u>
ABB Three Phase oil circuit Recloser (Shunt trip with static or relay type controls)	1070 07/24/75 1077 11/13/75 1394 11/20/89	To obtain experience.
Type ES-400 (15-400 amperes) Type ES-560 (15-560 amperes) Type ESM-560 (100-560 amperes) Type ES-105 (15-560 amperes)		
Cooper Power Systems (McGraw-Edis Single phase, Type D rated 100 amperes continuous 10,000 amperes symmetrical	<u>on)</u> 1410 08/16/90	To obtain experience.
Lexington Switch and Controls Three phase oil circuit recloser, 50,100 and 280 ampere frames. A Line, Model 3B (5-50 amperes) Model 3D (5-100 amperes) Model 3K (25-280 amperes)	808 01/07/65 1087 04/01/76	To obtain experience.
	24.9/14.4 kV	
Lexington Switch and Controls Oil circuit recloser, Single phase-A Line, Model M rated 100 amperes Three phase-A Line, Model 3M	620 04/18/57 1080 12/23/75 1329	To obtain experience.
rated 100 amperes	10/09/86 34.5/19.9 kV	
Cooper Power Systems (McGraw-Edis Single phase, Type DV rated 100-280 amperes continuous, 8,000 amperes symmetrical	<u>0n)</u> 1410 08/16/90	To obtain experience.

- 1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
- 2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Reclosers, vacuum interrupter

Manufacturer	Meeting Noand Date	Conditions
ABB Three phase Type ESVA rated 560/800 amps continuous, 12,000 amps symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	1259 05/19/83	To obtain experience.
Three phase Type ESMVA rated 560 amps continuous, 16,000 amps symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	1259 05/19/83	To obtain experience.
Three phase Type ESV rated 800 amps continuous, maximum voltage 38 kV 24.9/14.4 kV	1117 06/23/77 1239 07/29/82	To obtain experience.
Cooper Power Systems (McGraw-Edison) Single phase, Type V4H rated 5-100 amperes continuous, 2,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	921 06/26/69	To obtain experience.
Single phase, Type V4L rated 50-100 amperes continuous, 6,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	1410 08/16/90	To obtain experience.
Three phase, Type V6H rated 5-100 amperes continuous, 2,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	921 06/26/69	To obtain experience.

- 1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
- 2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser vacuum interrupter

Manufacturer	Meeting No. _and Date	Conditions
Cooper Power Systems (McGraw-Edison) Three phase, Type VW rated 560 amperes continuous , 2,000 amperes symmetical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	1005 12/07/72	To obtain experience.
Three phase, Type VWE rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	1005 12/07/72	To obtain experience.
Three phase, Type VSA-16 rated 560 amperes continuous, 16,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	1410 08/16/90	To obtain experience.
Three phase, Type VWV27 rated 560 amperes continuous 12,000 amperes symmetrical, maximum voltage 27 kV for 24.9/14.4 kV	1021 07/19/73	To obtain experience.
Three phase, Type VWVE27 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 27 kV for 24.9/14.4 kV	1014 04/12/73	To obtain experience.
Three phase, Type VWV38 rated 50-560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	1410 08/16/90	To obtain experience.

- 1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
- 2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, vacuum interrupter

Manufacturer	Meeting No. and Date	Conditions
Cooper Power Systems (McGraw-Edison) Three phase, Type VWVE38 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	1410 08/16/90	To obtain experience.
Three phase, Type VSO-12 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	1410 08/16/90	To obtain experience.
Three phase, Type VSO-16 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	1410 08/16/90	To obtain experience.
Single phase, type VXE electronically controlled, vacuum interrupting, rated 10-200 amps continuous, 8000 amperes symmetrical, maximum voltage of 15.5 kV for 12.5/7.2 kV & 27 kV for 24.9/14.4 kV systems	1474 10/07/93	To obtain experience.
Joslyn Three phase, Type JVR, SF6 insulation, rated 400 amps continuous, 6,000 amperes symmetrical, maximum voltage 15 kV for 12.5/7.2 kV	1446 05/14/92	To obtain experience.
Lexington Switch Single phase, type EV627 rated 400 amp continuous, 6000 amp interrupting, maximum voltage 27 kV for 24.9/14.4 kV	1459 01/07/93	To obtain experience.
Single phase, type EV815 rated 400 amp continuous, 8000 amp continuous, maximum voltage 15.5 kV	1474 10/07/93	To obtain experience.

NOTES:

for 12.9/14.4 kV

- 1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
- 2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, SF6 interrupter

Manufacturer Chance	Meeting No. and Date	<u>Conditions</u>
Single phase, Type SPR rated 280 amperes continuous, 4,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	1452 08/13/92	To obtain experience.

- 1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
- 2. Reclosers are not acceptable with load current, bushing CT battery chargers.

bh - Clevis, Service Deadend

Applicable Specification: "REA Specification for Service Deadend Clevises," D-8

<u>Manufacturer</u>	Clevis Only*	Clevis with dry process spool	Clevis with wet process spool
Chance	0341	0341-0606	0341-C909-1931
Cooper Power System (McGraw-Edison)	s DC3F1	-	-
Dixie	D0341	D0341-D	D0341-W
Joslyn	J0313	J0314	-
Kortick	K9250	K9100	К9099
Utilities Service	32136	31136	36136

^{*}Catalog number does not include spool; for spool see Page cm.

bi - Gain, Pole

For use with rectangular crossarms

Chance	4092
Continental	CAG-44-5
Flagg (MIF)	PX252

For braceless crossarms (narrow profile construction)

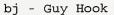
Continental	DEA-65-10A
Flagg (MIF)	PX182A
Reliable/Bethea	GCAF-6A

<u>Transmission</u>

Grid Gains

Sizes in inches

	4" x 4"	4" x 9"
Chance	PG44	PG945
Continental	GGSF-4040-7	GRF-9045-7
Flagg (MIF)	PX122	PX260
Hughes Brothers	1263	1260
Joslyn	J6064	
Reliable/Bethea	GSF-44-7	GSFT-95-7



Applicable Specification: Edison Electric Institute Specification TD-11 1951, "Specifications for Guy Hooks and Guy Strain Plates."

Chance			6584
Cooper	Power	Systems	DG4H1

(McGraw-Edison)

Dixie D6584

Joslyn J1019

Kortick K4031

Utilities Service 5310



bk - Guy Plate

Applicable Specifications:

Strain Type: Edison Electric Institute Specification TD-11 1951, "Specifications for Guy Hooks and Guy Strain Plates."

Lift Type: None

	Strain Type 4" x 8" x 14 gage	Lift Type 2-1/2" x 7" x 1/4", 2 hole
Chance	6575	7898
Cooper Power Systems (McGraw-Edison)	DG1M2	DG4M2
Dixie	D6575	D7888
Joslyn	J1034	J7894
Kortick	K4015	K3511
Line Hardware	GSP-1	
Utilities Service	5351	C434
		•

bn - clamp, loop deadend
For ACSR

	3/0	2/0	1/0	2	4
			44.0		
ALCOA	-	413	413	412	411
Anderson/Sq. D	LC-74B	LC-71B	LC-70B1	LC-70B	LC-70B
Blackburn	DLC23	DLC2106	DLC2106	DLC2106	DLC2106
Burndy	-	-	UW25R	UW2R	UW2R
C & R	-	-	CRLD-10	CRLD-10	CRLD-10
Fargo	GA-145	GA-145	GA-144	GA-144	GA-144
Reliable/Bethea	ALD-7373-U	ALD-34-U	ALD-1313-U	ALD-1313-U	ALD-1313-



bo - Shackle, anchor

Manufacturer		<u>Catalog Numbe</u> r
	Distribution	
		20,000 lbs. 5/8" Pin
Anderson/Sq. D		AS-25
Chance		5801
Continental		AS-25-5-4
Cooper Power Systems (McGraw-Edison)		DC7J1
Dixie		D5801
Flagg		12300
Joslyn		J2742
Kortick		K4481
Lapp		33852
Lindsey		3260
Line Hardware		AS-1
Reliable/Bethea		ASH-45
Sur-Loc, Inc.		5500
Utilities Service		4106

<u>Transmission</u>

	30,000 lbs. <u>3/4" bolt</u>	50,000 lbs. <u>7/8" bolt</u>
Joslyn	BT3023BNK	BT3036BNK
Flagg	13302BNK	16301FBNK

br - Chain Link (End Link)

Manufacturer	<u>Catalog Number</u>
Continental	L-5
Flagg	14100F
Joslyn (Brewer-Titchener)	BT-3082-HT
Lapp	6415-HT
Lindsey	3403
Reliable/Bethea	CL-5

bs - Bolt, single upset

Applicable Specifications: "REA Specifications for Single and Double Upset Spool Bolts," D-5

Diameter, inches Length, inches	5/8 7	5/8 8	5/8 9	5/8 10
Chance		7741	7741-1/2	7742
Cooper* (McGraw- Edison)		DC2E3	DC2E4	DC2E5
Dixie	D7740	D7741	D7741-1/2	D7742
Joslyn	-	J2342-1/2	J2343-1/2	J2344-1/2
Kortick	K4929	K4950	K4930	K4951
Utilities Service	3105-1/2	31053	31053A	31054



^{*&}quot;Static proof" designs available.

bt - Wireholder, clevis type with No. 24 wood screw

(For use with triplex type service cable, Drawing K10C-A)

Chance	0192*
Cooper Power Systems (McGraw-Edison)	DW5R1*
Dixie	D075*
Joslyn	J075*

^{*}Catalog number does not include insulator. Use secondary type spool insulator with 1-3/4 inch groove diameter. See page cm-1.

bu - Connector, grounding for transformer or other equipment

Manufacturer	Copper 1 Alloy 1	Plated Copper Alloy 2	Aluminum Alloy 3
Anderson/Square D	GTCL-23A	GTCL-23A-TP	
Blackburn	TTC-4	TTC2P	
Burndy	EQC632C	EQC632C-TN	
Dossert	TGCL8-50	TGCL8-50-SN	
Fargo	GC-207	GC-207P	GA-220
Line Hardware	TGL-110	TGL-110P	
Penn-Union		GSE-C1TN	
Tanner		GET-1-TN	

^{1 -} For use with copper type ground wire.

^{2 -} For use with both copper and aluminum type ground wire.

^{3 -} For use with aluminum type ground wire.

bv - Rods, armor

(includes standard, double insulator, and tapping rods)

Aluminum or aluminum alloy rods for use on ACSR

Alcoa Formed Type
Carolina Formed Wire Formed Type
Chance Formed Type
Dulmison Formed Type
Florida Wire and Cable Formed Type
Helical Line Products Formed Type
Preformed Line Products Formed Type

Copperweld rods for copper or CWC conductor

Helical Line Products Formed Type

Preformed Line Products Formed Type

Alumoweld rods for aluminum clad steel (Alumoweld) overhead ground wire

Helical Line Products Formed Type

Preformed Line Products Formed Type

bx - Splice, automatic

Copper	<u>Fargo</u>	Reliable
6	GL-111	61
4	GL-112	41
2 x 3	GL-115	-
1/10 x 7	GL-117	107
2/0 x 7	GL-118	207
3/0 x 7	GL-119	307
4/0 x 7	GL-120	407
CWC		
A8	GL-112	
6A	GL-113	47
4A	GL-115	27
2A	GL-117	
ACSR	GL-400 Series*	7650 Series*
Aluminum Alloy		
(6201 and 5005)	GL-100A Series GL-1000A Series	AL55 Series

^{*}For use on distribution conductors 4/0 and smaller only.

To obtain experience.

bx - Splice, automatic

Manufacturer	Meeting No. and Date	<u>Conditions</u>
	DISTRIBUTION	
Blackburn #4, #2 ACSR or 6201 (ACSR equiv.) ATS42 1/0, 2/0 ACSR or 6201 (ACSR equiv.) ATS1020 3/0, 4/0 ACSR or 6201 (ACSR equiv.) ATS3040 266.8, 336.4 kcmil ACSR ATS266 477 kcmil ACSR ATS397477	1406 06/14/90 1453 09/03/92	 To obtain experience. For use on distribution systems only.
Fargo AWAC 4 - 4/3 GLA-105 AWAC 2 - 4/3 GLA-110 AWAC 1/0 - 4/3 GLA-115	1087 04/01/76	Same as above.
266.8 kcmil ACSR 18/1 GL-1315A 336.4 kcmil ACSR 18/1 GL-1315A 477 kcmil ACSR 18/1 GL-1325A	B55 02/12/86	Same as above.
Reliable 266.8 kcmil ACSR 18/1 7657 336.4 kcmil ACSR 18/1 7658 477 kcmil ACSR 18/1 7659	1412 09/20/90	Same as above.

DISTRIBUTION AND TRANSMISSION

Fargo
266.8 kcmil ACSR 26/7
336.4 kcmil ACSR 26/7
477 kcmil ACSR 26/7
05/18/89

by - Deadend, automatic and formed Type

Conductor Size

<u>Cu</u>	<u>CWC</u>	<u>Farqo</u>	<u>Reliable</u>
-	4A	GD-515	27-SDS
-	6A	GD-513	47-SDS
_	8A	GD-512	-
2 x 3	-	GD-515	271
4	-	GD-512	41LD
6	-	GD-511	61LD

<u>ACSR</u>

*Blackburn	ATD Series
*Dulmison	AWDG-0805, 0990, and 1135
*Fargo	GD-400 Series
*Preformed	OG-9360 thru 9366 #OHDE-9534 thru 9540, 4577
*Reliable	7650 Series

May only be used with a spool insulator (Item cm) and appropriate clevis for neutral and secondary applications.

Aluminum Alloy (6201 and 5005)

Blackburn	ATD Series
Fargo	GD-A Series
Preformed	OG-9360 thru 9366
Reliable	AL Series

^{*}For use on distribution conductors 4/0 and smaller only.

by - Deadends, automatic and formed type

FORMED TYPE

Manufacturer	Meeting No. _and Date	Conditions
Carolina Formed Wire #4 - 6/1, 7/1 ACSR #55-0229 #2 - 6/1 ACSR #55-0290 #1/0 - 6/1 ACSR #55-0365	1434 10/23/91	To obtain experience.
Preformed Line Products AWAC 4 - 4/3 DG-4560 AWAC 2 - 4/3 DG-4562 AWAC 1/0 - 4/3 DG-4565	993 06/08/72	To obtain experience.

AUTOMATIC TYPE

Farqo AWAC 4 - 4/3 GDA-235 AWAC 2 - 4/3 GDA-240 AWAC 1/0 - 4/3 GDA-245	1086 04/01/76	To obtain experience.
266.8 kcmil ACSR 18/1 GD-5315A 336.4 kcmil ACSR 18/1 GD-5315A 477 kcmil ACSR 18/1 GD-5325A	B55 02/12/86	 To obtain experience. For use on distribution lines only.
Reliable AWAC 4 - 4/3 5201 AWAC 2 - 4/3 5202 AWAC 1/0 - 4/3 5204	1026 09/27/73 1035 02/21/74	To obtain experience.
226.8 kcmil ACSR 18/1 7657 SDS 335.4 kcmil ACSR 18/1 7658 SDS 477 kcmil ACSR 18/1 7659 SDS	1412 09/20/90	 To obtain experience. For use on distribution lines only.

bz - Switch, oil

12.5/7.2 kV

	<u>Type</u>	<u>Description</u>
ABB	CSL**	Single-phase, manual and remote manual or elec. control, 200 amp. Three-phase, remote manual or elec. control, 200 amp.
Cooper Power Systems (McGraw-Edison)	NR* VR*	Single-phase, remote elec. control, 200 amp. Three-phase, remote elec. control, 400 amp.
General Electric	FKC-2 FKC-2*	Single and three-phase, manual, 200 amp. Single and three-phase, remote control, 200 amp.

 $[\]star$ Control equipment should be selected in accordance with the requirements of individual installations.

^{**}This item is also available in a special design for use in areas where corrosion is a serious problem.

bz - Switch, oil

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
Cooper Power Systems (McGraw-Edison) Capacitor oil switch Type TSC, 38 kV max. 100 ampere capacitor switch 300 ampere load switch	940 04/02/70	To obtain experience.
Oil switch with 125 kV BIL accessory Type NR, 15 kV, single- phase, remote electric control, 200 amp. at 75 to 100 percent power factor	1046 07/25/74	 To obtain experience. For use on single-phase taps of 24.9/14.4 kV multi-grounded wye systems.
Trinetics Capacitor, oil switch Type CSD-95, 95 kV BIL 15 kV Max. 200amp.	1284 08/02/84	To obtain experience.
Oil switch with 125 kV BIL accessory, CSD-125, 15 kV, single-phase, 200 amp	1290 11/29/84 1351 10/29/87	 To obtain experience. For use on single- phase taps of 24.9/14.4 kV multi- grounded wye systems.

bz - Switch, vacuum
(For capacitor switching)

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	Conditions
<u>Joslyn</u>		
Capacitor vacuum switch,	1451	 To obtain experience.
VerSaVac, 200 Amp,	07/30/92	
95 or 125 kV BIL,	1458	Single-phase switch
single-phase or	12/10/92	rated 125 kV BIL may
three-phase for use on		be used on single-
15 kV systems		phase taps of
		24.9/14.4 kV multi-
		grounded wye systems.
		g
		3. Three-phase switch
		requires special
		mounting bracket.
		mountaing bracket.

cg - Switch, air, three-pole, group-operated NEMA standard switches for station and line structures

Double Break Type kV

		NEMA	standard	switches	for statio	NEMA standard switches for station and line structures		
<u>Manufacturer</u>	Acceptable Mounting on Structures	Tilting Ins. Type kV	Ins.	Vertical Break Type <u>kv</u>	Break kV	Side Break Type kV	Center Type	Break kV
ABB	Horizontal			TTR6	15-345			
A. B. Chance	Horizontal Phase over Pha Vertical	Phase				D6 (L) 15-34.5 D6 (L) 15-34.5 D6 (L) 15-34.5		
G & W Electric Co.	Horizontal			MK-40	15-69	PMB-40A 15-69	PC 6	69-230
Johnson	Horizontal			VIP 15	15-230	LS 15-69	M 15-230	230
Joslyn (Hi-Voltage)	Horizontal Horizontal			RF-2 (VL) 15-230	15-230	RB-1 (VL)15-25 RB-1* 15-115		
Kearney	Horizontal			AR 60-P	15-69			
MEMCO	Horizontal Horizontal	Agr AgC	15-69 15-69	ЕA	15-345	R14-C 15-46	н	69-230
MORPAC (Morgan)	Horizontal Vertical Phase over Pha	Phase		VBV (VL)	15-230 15-230		CBV CBV CBV	15-230 15-230 15-25
Royal Switchgear	Horizontal Phase over Pha	Phase					>>	15-230 15-23

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available. *These switches may be purchased with reduced voltage vacuum interrupters and may be applied for loop sectionalizing duty when peak recovery voltage does not exceed 25 kV

Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods. NOTE:

cg - Switch, air, three-pole, group-operated NEMA standard switches for station and line structures

Double Break Type <u>kV</u>	Alduti(L)34.5-46 Alduti(L)34.5-46 Alduti(L)*34.5-46					-
Center Break Type ky			CCB115-230 CBL-2 115-230	EC 115-230	15-161	AGCH **15-345 AGCH-V**34.5-230 GCH 15-23
Side Break Type kV	Alduti(L)15-25 Alduti(L)15-25 Alduti(L)15-25	GOABS (VL) 15-69	SSB-T 15-69	57K 15-69	(1D, 2D, 3D) (VL) 15-161 1D(VL) 15-161	GSH-4 (VL) 15-138 GSH-4 (VL) 15-138
Vertical Break Type kV	Alduti(L)15-34.5 Alduti(L)15-25 Alduti(L)*15-34.5		TA(VL) 15-69 AVB(VL)**115-345	EV 15-230	TH1 (VL) 15-161	AVR (VL) **15-230
Tilting Ins. Type kV	phase	hase			hase	hase
Acceptable Mounting on Structures	Horizontal Phase over Phase Vertical	Phase over Phase	Horizontal	Horizontal	Phase over Phase Horizontal Horizontal	Horizontal Horizontal Phase over Phase
Manufacturer	S C * * *	SEECO	Siemens-Allis	Southern States	Turner	usco

(L) Means gas or solid material full-load interrupters are accepted and available

(VL) Means vacuum full-load interrupters are accepted and available.

U لاي Ŋ the *These switches, except 34.5 kV Alduti vertical break, are available and accepted with type SMD substation fuse cutouts listed on page af-3.

** Also available in bronze in some ratings.

***Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods. NOTE:

Manufacturer	Mounting	Vertical Type kV	Side Break Type kV
Chance	Vertical Horizontal		D7(L) 15-27 D7(L) 15-27
S & C*	Phase-over-Phase Vertical	Alduti(L) 34.5 (200 kV BIL) Alduti (L) 34.5 (200 kV BIL)	Alduti(L) 34.5 (200 kV BIL)

⁽L) Means gas or solid material full-load interrupters are accepted and available.

^{*}Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

cg - Switch, air, three-pole, group operated (not Suitable for Substation Use)

Center Break Iype k <u>V</u>		V 15-23 V 15-23
Side Break Type kV D6 (L) 15-34.5 D6 (L) 15-34.5 D7 (L) 15-34.5	SB_H(L) 15-35 SB_P(L) 15-35	
Vertical Break Type kV		
Acceptable Mounting Horizontal Phase over Phase	Horizontal Phase over Phase	Horizontal Phase over Phase
<u>Manufacturer</u> Chance	Kearney/KPF	Royal Switchgear

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available

Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

NOTE:

Manufacturer	Acceptable Mounting on <u>Structures</u>	Vertical Break Type kV	Side Break Type kV
ABB	Horizontal (A)		SLB-3(L)15-25
Chance	Horizontal (A) Phase over phase (A) Vertical (A)		D7 (L) 15-27 D7 (L) 15-27 D7 (L) 15-27
	Horizontal (B)		D7(L)34.5
	Phase over phase (B)		D7(L)34.5
	Vertical (B)		D7(L)34.5
Kearney/KPF	Horizontal (A) Phase over phase (A)		SB_H(L) 15-35 SB_P(L) 15-35
S&C*	Horizontal (A)		Alduti(L)15-25 Alduti(L)34.5 (200 kV BIL)
	Phase over phase (A)		Alduti(L)25 Alduti(L)34.5 (200 kV BIL)
	Vertical (A)		Alduti(L)15-25 Alduti(L)34.5 (200 kV BIL)
	Phase over phase (B)	Alduti(L)34.5	Alduti(L)34.5
	Vertical (B)	Alduti(L)34.5	

- (L) Means gas or solid material full-load interrupters are accepted and available.
- (A) Not suitable for substation use.
- (B) For station and transmission use only. The steel crossarm base must be grounded with an adequate grounding connector. 200 kV BIL only.

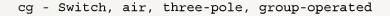
NOTE: Switches with factory-assembled crossarm type bases for distribution lines must have non-conducting crossarm type bases, non-conducting braces, and insulated interphase and control rods, except as otherwise noted.

^{*}Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

cg - Switch, air, three-pole, group operated

	Mooting No	
Manufacturer	Meeting No. and Date	Conditions
Chance Type S (L) Side-break, horizontal phase-over-phase, and vertical mounting, with non-conducting crossarm type base and insulated interphase and control rods, 15 and 25 kV.	1429 08/01/91	To obtain experience.
Cleaveland/Price Type V2-C (15-69 kV) Vertical break, horizontal or vertical mounting Type RL-C (15-69 kV) Single side break, horizontal or vertical mounting	1462 02/25/93	 To obtain experience. Insulated interphase and control rods required on wood distribution structures.
G & W Electric Company Type MK-40A 15 kV through 345 kV (horizontal upright mounting)	1243 09/23/82 912 02/20/69 1005 12/07/72	 To obtain experience. Insulated interphase and control rods required on 15 kV and 23 kV models used on wood structures. Steel interphase base required when mounted as in REA Drawing TM-3.
Type LPV, 3-pole 72.5-272 kV, 1200 amp., 1600 amp., 2000 amp., center sidebreak for horizontal mounting.	1064 05/01/75	To obtain experience.

- (L) Means full-load interrupter accepted and available.
- (VL) Means vacuum full-load interrupters are accepted and available.



<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
PASCOR VBP (15 - 230 kV) VBS (69 - 230 kV) Vertical break, vertical or horizontal mounting. Phase-over-Phase mounting (VBS, 69 - 115 kV only)	1405 05/31/90	 To obtain experience. Insulated interphase and control rods required on wood distribution structures.
SB (15 - 69 kV) Side break, vertical or horizontal mounting.	1413 10/11/90	 To obtain experience. insulated interphase and control rods required on wood distribution structures.
CB (15 - 115 kV) Center break, vertical or horizontal mounting.	1413 10/11/90 1417 12/20/90	 To obtain experience Insulated interphase and control rods required on wood distribution structures.
CBSA (69 - 138 kV) Center Break Vee, vertical, horizontal, or phase-over-phase mounting. (Also accepted as a copper switch at 69 - 115 kV.)	1446 05/14/92	To obtain experience.
<pre>S & C* Line-rupter with SF₆ inter- rupter. Horizontal mounted 69-230 kV Vertical mounted 69-161 kV</pre>	1202 12/18/80	To obtain experience.
Omni-Rupter (L) Side-break, horizontal phase-over-phase, and vertical mounting, with non-conducting crossarm type base and insulated interphase and control rods, 15 kV and 25kV	1355 01/14/88 1371 10/06/88	To obtain experience. To obtain experience.

- (L) Means full-load interrupter accepted and available.
- (VL) Means vacuum full-load interrupters are accepted and available.
- *Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.



cg - Switch, Air, Three-Pole, Group Operated

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
SEECO GOABS (VL) Vacuum interrupter type 115-169 kV	1201 12/04/80	To obtain experience.
Siemens-Allis Type CBL-T, 15-69 kV 600 and 1200 amp (center break, horizontal upright mounting)	1100 10/21/76	 To obtain experience. Insulated interphase and control rods required on 15 kV and 25 kV models used on wood structures.
Southern States "Pole-Pak" 15-23 kV	800 08/20/64	To obtain experience.
Type ES; 15, 23 and 34.5 kV (horizontal upright models only)	897 07/11/68	 To obtain experience. For 15 kV and 23 kV distribution lines: insulated interphase and control rod spacers required. See REA Drawings M3-15 and VM3-16. NEMA insulators and steel interphase base required for transmission line structure as in TM-3.
		4. Acceptable on steel substations 15 through 34.5 kV with NEMA insulators and uninsulated interphase rods.
Type 57L sidebreak, 115-161 kV,600 and 1200 amp., horizontal upright	1067 06/12/75	To obtain experience.

- (L) Means full-load interrupter accepted and available.
- (VL) Means vacuum full-load interrupters are accepted and available.

cg - Switch, Air, Three-Pole, Group Operated

Manufacturer	Meeting No. and Date	<u>Conditions</u>
Travis Switchgear MA-32512, 25 kV, 150 kV BIL, vertical break	1454 09/24/92	 To obtain experience. Insulated interphase and control rods required when used on wood structures.



ci - Clevis, thimble

Rated Strength

 Manufacturer
 20,000 lbs.
 40,000 lbs.
 50,000 lbs.

 Flagg
 PA271
 PA272B



cj - Pole Ground Wire

Soft annealed iron, BB Grade, class C galvanizing (For pole protection only)

Size 1.15 Ohms/1000 ft., max.

Manufacturer

Bethlehem Steel	3-wire,	5/16	inch
Florida Wire and Cable	3-wire,	5/16	inch
Indiana Steel and Wire	3-wire,	5/16	inch
National Strand Products	3-wire,	5/16	inch
Southwire	3-wire,	5/16	inch

Copper, soft annealed solid ASTM Specification B3

Manufacturer
(See page av-2)

Aluminum (for above ground use only)
Three-quarter hard-drawn EC grade

Manufacturer
(See page av-1)

Aluminum Alloy (for above ground use only)

<u>Manufacturer</u>	<u>Type</u>
ACPC, Inc.	6201
Alcan Cable	6201
American Electrical	6201
Southwire	6201

Copper-Clad Steel, Annealed 40 percent Conductivity

<u>Manuracturer</u>	Size
Copperweld Southern*	No. 6

^{*} Not for use on distribution when neutral is larger than #1/0 ACSR.

cj - Pole Ground Wire Aluminum Alloy (for above ground use only)

<u>Manufacturer</u>	Meeting No. _and Date	Conditions
ACPC, Inc. 8177	1248 12/02/82 1475 10/21/93	To obtain experience.

ck - clamp, anchor rod bonding

For Standard and Drive Type Rods

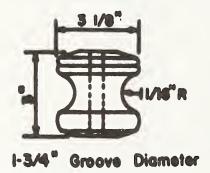
Diam. of Rod	Type of Eye	<u>5/8"</u>	3/4"	_1"
C & R Products	Single Twin Triple	CRBC-1 CRBC-2	CRBC-1 CRBC-2 CRBC-3	CRBC-1 CRBC-2 CRBC-3
Chance	Single	G5060	G5060	G5060
	Twin	G5061	G5061	G5061
	Triple	-	G5063	G5063
Cooper Power Systems	Single	DA1B1	DA1B1	DA1B1
(McGraw-Edison)	Twin	DA2B1	DA2B1	DA2B1
Dixie	Single	D3143	D3143	D3143
	Twin	-	D3144	D3144
	Triple	-	D3145	D3145
Joslyn	Single	3230	3230	3230
	Twin	3231	3231	3231
	Triple	-	3233	3233
Kortick	Single	K3147	K3147	-
	Twin	-	K3148	K3148
	Triple	-	K3149	K3149
Utilities Service	Single	CG5060	CG5060	-
	Twin	-	CG5061	CG5061
	Triple	-	CG5063	CG5063

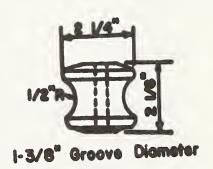
For Power Installed Screw Anchors

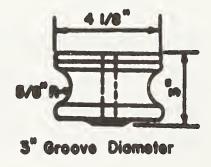
C & R Products	Single	CRBC-4	CRBC-5	-
Chance	Single	G5067	G5068	-
Joslyn	Single	J26714	J26715	_

cm - Insulator, Spool

Type:	Secondary (Wet	Secondary (Wet Process)		rice Dry Process
Groove Diameter:	1-3/4"	<u>3"</u>	1-3/8"	1-3/8"
Chance	C909-1032	C909-1034	C909-1031	0606
Cooper Power Systems (McGraw-Edison)	DE4S3	DE5S3	DE2S2	DE2S1
Hughes	2102	-	-	-
Joslyn	J151	J0101	J150	J100
Kortick	K516	K522	K513	K514
Porcelain Products (Knox)	5101	5119	5107	5207
Universal	1082	-	-	-
Utilities Service	205	31221	208	207
Victor Insulators, Inc.	2012	2026	2011	-







cp - Deadend, Compression Type

<u>ACSR</u>

Size	Alcoa		Anderson	n/Sq. D
1/0 2/0 3/0 4/0	Order by Conductor Size and Stranding		VCD-50R thru VCD-61R	
266.8 kcmil 18/1 336.4 kcmil 18/1 477 kcmil 18/1			VCD-80-F VCD-80-F VCD-812-	₹
266.8 kcmil 26/7 336.4 kcmil 26/7 477 kcmil 26/7 556.5 kcmil 26/7 795 kcmil 26/7 954 kcmil 54/7	2-piece alloy compression Type VES or HES		VCD-831- VCD-831- VCD-832- VCD-833- VCD-835- VCD-835-	-1-RM -2-RM -3-RM -4RM
ConductorSize	Burndy	<u>Fargo</u>		<u>Kearney</u>
1/0 2/0 3/0 4/0	Type Y-W	SEDA-8129 SEDA-7729 SEDA-7829 SEDA-7929)	104000 thru 104000-03
266.8 kcmil 18/1 336.8 kcmil 18/1 477 kcmil 18/1				
266.8 kcmil 26/7 336.4 kcmil 26/7 477 kcmil 26/7 556.5 kcmil 26/7 795 kcmil 26/7	Type Y-W Type YTW "	Uni-Grip one die system Order by conductor		104000-05 thru 104000-14

Conductor

954 kcmil 54/7

NOTE: These compression deadends are acceptable when installed using tools and dies in accordance with the deadend manufacturer's recommendations.

and stranding

cp - Deadend, Compression Type

ACSR Adjustable

Fargo Order by conductor size and stranding

Aluminum Alloy (6201 and 5005)
Conductor Size: 4 thru 4/0

Anderson/Sq. D Type VCD, Order by conductor size.

Conductor Size: 2 x 3 4 6

National Tel. Supply 71-258/3X 71-204-P 71-162-J

<u>Conductor Size:</u> 6A 8A

National Tel. Supply 71-6A-P 71-8A-P

cp - Deadend, compression type

Manufacturer

Burndy
AWAC 4-4/3 YTW7M10T
AWAC 2-4/3 YTW7M9T
AWAC 1/0-4/3 YTW7M7T

Meeting No. and Date

1050 09/19/74 Conditions

To obtain experience.

cq - Deadend, Secondary (For use on secondary deadends only)

<u>Copper</u> Offset Compression

Conductor Size: 4 6

National Telephone Supply 91-204-P 91-162-J

Copperweld-Copper
Offset Compression

Conductor Size: 6A 8A

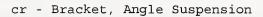
National Telephone Supply 91-6A-P 91-8A-P

Copperweld-Copper
Automatic Deadend

Conductor Size: 6A 8A

Fargo GD-113 GD-112

Reliable 47FD



Applicable Specifications: "REA Specification for Angle Suspension Brackets," DT-4

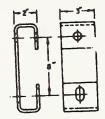
<u>Manufacturer</u>	Distribution5/8" Diam.	Transmission3/4" Diam.
Chance		5728
Cooper Power Systems (McGraw-Edison)	DC8E1	
Joslyn	J7935	J7936
Kortick	K6231	K6230
Utilities Service	545	546

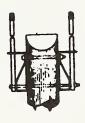
cs - Bracket, Pole Top Pin

For Transmission and 24.9/14.4 kV Distribution

Applicable Specifications: "REA Specifications for Pole Top Brackets for Channel Type Pins," D-14

Chance	2157
Cooper Power Systems (McGraw-Edison)	DP3A1
Joslyn	J2045
Kortick	K8130
Utilities Service	36690





ct - Plate, Double Arming

Transmission

Manufacturer	<u>4" x 1/2" x 24"</u>	4" x 1/4" x 17"
Chance	5844	5819
Cooper Power Systems (McGraw-Edison)	DP21A1	DP23A3
Dixie	D5844	D5845
Joslyn	J1600	J1607
Kortick	K1454	K1465
Line Hardware	-	DAP-17
Utilities Service	4117	-

cu - Brace, crossarm, wood

Span, inches Drop, inches	60 <u>18</u>	60 <u>30</u>
Aluma-Form	6018	6030
Brooks	446-60-18	446-60-30
Cascadian	15018	15030
Dis-Tran	DT-60R	
Hatheway Patterson	320-R	325-R
Hughes Brothers	2045-CC	2045-D
Joslyn	J4760	J4730
Utilities Structures Engineering Incorporated	CU-60-18	CU-60-30

Braces listed below have 26-inch hole spacing. They are to be used in place of the flat steel braces previously listed on page h.

Aluma-Form	AF626
Brooks	58128
Hatheway Patterson	7026
Hughes Brothers	2023
Joslyn	J5526

Brace, crossarm, fiber reinforced plastic

Continental	CRB-28
Dulmison	CAB-28
Hughes Brothers	533
Stanley Flagg	FCB26

cx - Splice, oval tube

Copper

 Conductor Size:
 0 x 7
 2 x 3
 4
 6

 National Tel. Supply
 464
 463
 459
 457

Copperweld-Copper

Conductor Size: 6A 8A
National Tel. Supply 460 459



Alcoa

Order

by

266.8 kcmil 26/7 Uni-grip

one die

Order by

conductor size

and stranding

system

336.4 kcmil 26/7

556.5 kcmil 26/7

477 kcmil 26/7

795 kcmil 26.7

954 kcmil 54/7

2-piece

Conductor

Size

4 6/1

4 7/1

2 6/1

cy - Splice, Compression

<u>ACSR</u>

Anderson/

Burndy

or Y-S

"Unisplice"

HR-266-267A

HR-477-267A

HR-556-267A

HR336-267A

(1-piece)

Sq. D

VC-36R

VC-36R

VC-36R

2 7/1 1/0 2/0 3/0 4/0	Conductor Size and Stranding	VC-36R VC-50R VC-50R VC-61R VC-61R	(2-piece) Order by Conductor Size and Stranding	
266.8 kcmil 18/1 336.4 kcmil 18/1 477 kcmil 18/1		VC-80-R VC-80-R VC-90-R		
266.8 kcmil 26/7 336.4 kcmil 26/7 477 kcmil 26/7 556.6 kcmil 26/7 795 kcmil 26/7 954 kcmil 54/7	2-piece Compression Alloy Type CJ	VC-831-1-RM VC-831-1-RM VC-832-2-RM VC-833-3-RM VC-835-4RM VC-835-4RM	2-piece Type YTS " " "	
Conductor Size 4 6/1 4 7/1 2 6/1 2 7/1 1/0 2/0 3/0 4/0	Farqo TJA-8129 TJA-7729 TJA-7829 TJA-7929	Blackburn Type RC 1-piece Order by Conductor Size and Stranding	Kearney 2 pc. OH1/0-61A OHR2/0-61A OHR3/0-61A HR4/0-61A	1 pc. OH4-61-71AS OH4-61-71AS OH2-61-71AS OH2-61-71AS OH1/0-61AS
266.8 kcmil 18/1 336.4 kcmil 18/1 477 kcmil 18/1				

These splices are acceptable when installed with tools and dies in NOTE: accordance with the splice manufacturer's recommendations.



cy - Splice, Compression

ACSR

Conductor <u>Size</u>	Nat. Tel. Supply	<u>Homac</u>	ESP
4 6/1 4 7/1 2 6/1 2 7/1 1/0 2/0 3/0 4/0	"Nicopress" (1-pc. or 2-pc.) Order by Conductor Size and Stranding 2-pc. "	"Tension splicer" (1-piece or 2-piece Order by Conductor Size and Stranding	FTR-4 FTR-4 FTR-2 FTR-2.5 FTR-1/0 FTR-2/0.5 FTR-3/0 FTR-4/0
266.8 kcmil 26/7 336.4 kcmil 26/7 477 kcmil 26/7 556.5 kcmil 26/7 795 kcmil 26/7 954 kcmil 54/7	1) 11 11	2-pc.	



NOTE: These splices are acceptable when installed with tools and dies in accordance with the splice manufacturer's recommendations.

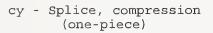
Splice, Compression

Copper and Copperweld-Copper

Conductor Size	Anderson/ Sq. D	Burndy	<u>Kearney</u>	National <u>Tel. Supply</u>
6 cu	VCC-28	YDS6W	OH6C	1-162/J
4 cu	VCC-28	YDS4W	OH4C	1-204/P
2 x 3 cu	-	YDS2C-3	OH2-3CX	1-258/3X
0 x 7 cu	-	YDS25	OH1-7C	1-325/7F6
8A CWC	VCC-28	YDS8KT	OHR8ACW	1-8A-P
6A CWC	VCC-28	YDS6KT	OHR6ACW	1-6A-P
4A CWC	VCC-37	YDS4KT	OHR4ACW	1-4A-X
2A CWC	VCC-43	-	-	-

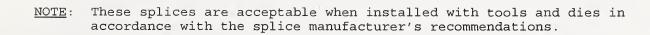
Conductor Size	Homac	
6 cu	J2C3	
4 cu	L2C5	
2 x 3 cu	S2C7	
0 x 7 cu	U2C9	
8A CWC	L2E1	
6A CWC	L2E3	
4A CWC	Q2E5	
2A CWC	U2E7	

NOTE: These splices are acceptable when installed with tools and dies in accordance with the splice manufacturer's recommendations.



(For 6201 and 5005 Aluminum Alloy Conductors)

ConductorSize	Anderson/ Square D	<u>Burndy</u>	Blackburn
#4 thru 4/0	Type VC-R Order by Conductor Size and Stranding	"Unisplice" Order by Conductor Size and Stranding	Type RC Order by Conductor Size and Stranding
Conductor <u>Size</u>	<u>Homac</u>		ESP
#4 thru 4/0	"Tension Splicer" Order by Conductor Size and Stranding		Type FTR order by size and stranding



cy - Splice, compression

1-piece splice for ACSR

Meeting No.

<u>and Date</u>

*ALCOA

"Jiffy Joint"

To obtain experience.

11/10/60

1-piece splice for AWAC

Burndy
AWAC 4-4/3 1050 To obtain experience.
YDS7M10T 09/19/74
AWAC 2-4/3
YDS7M9T
AWAC 1/0-4/3
YDS7M7T

NOTE: These splices are acceptable when installed using tools and dies in accordance with the splice manufacturer's recommendations.

^{*}Satisfactory for use with 6201 and 5005 all aluminum alloy conductor through 4/0 and 19 strand conductors of sizes 266.8 kcmil and 477 kcmil.

cz - Splice for Steel Strand (Overhead Ground Wire)

		Compression	Single Sleeve Only
--	--	-------------	--------------------

Extra High Strength	/16" 7 NO. 9 AW	4914.386 4916.453	TCMCSTY TBCCT TDCCTMGT TDCCTMCT	811425 811630 811425 811427 811630			Steel and Aluminum Sleeves	Automatic	5042 5043 5042 5042 5043	Bolted Type	Formed Type	10SS 3/8C 16SS 7/16C	
Extra Hi	5/16"	4914		811222 811			Steel		5041 5			6SS 5/16C 10SS	
ath Steel			YTS438E	811630		5-7/145J22			5043			16SS 7/16C	
High Strength	3/8"		YTS375E	811425	HR-3/8-3-7S	5-7/120G92	28414 (Two piece)		5002	GD-537		10SS 3/8C	
		Alcoa	Burndy	Fargo	Kearney	National. Tel. Supply	Номас		Reliable	Electroline		Chance	Helical Line

da - Bracket, insulated

	Bracket without <u>Insulator</u>	Bracket with 1-3/4" Spool <u>Insulator</u>	Bracket with 3" Spool Insulator
Chance	0327	0327-C909-1032	0327-C909-1034
Cooper (McGraw- Edison)	DC2C1	-	-
Dixie	D0327	-	-
Hughes Brothers	1077LI	1077SI	1077I
Joslyn	J1300	J1301	J1303
Kortick	K9278	K9081	К9082

dh - Ground, pole

(For system grounds see ground rods on page ai.)

Manufacturer

Catalog Number

<u>Galvanized Steel Plate With Insulated</u> <u>Copper Lead</u>

(For connecting to a copper or aluminum ground wire above ground.)

Cooper Power Systems (McGraw-Edison)

DN13M1

Joslyn Line Hardware J055W PGPS-56CL8

Galvanized Steel Plate with Connector
(For connecting to a galvanized iron ground wire)

Joslyn

J055

Line Hardware

PGPS-56C

Copper Plate

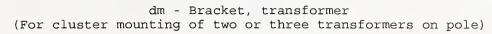
Blackburn Drabco Homac Joslyn Line Hardware GP-100 D 101 5575 J9196 PGPC-56

dl - Pipe Spacer

3/4" diameter x 1-1/2" length

<u>Manufacturer</u>	<u>Catalog Number</u>
Chance	2237
Cooper Power Systems (McGraw-Edison)	DM3P2
Dixie	D2031
Joslyn	J2031
Utilities Service	36695

205-25



<u>Manufacturer</u>	Transformer Size, kVA	Band Type	Through Bolt Type
Aluma-Form	3-50	6M3-6	3MW-24-M
	75-100	15M3-6	11MW-24
Chance	3-50	C212-8002 C212-8003	C212-0142
	75-100	C212-8005	C212-0146
Cooper Power Systems	3-25 DT25Cl	(Use 3 no. DT17Al	DT6Cl
(McGraw-Edison)	37 1/2-50	Adapter Plates) DT25C4	DT7Cl
	75-100	DT25C4	DT8Cl
Dixie	3-25		DW-50
211110	37-1/2-50		DW-50
	75-100		DW-167
Hughes	3-25		3021
-	37-1/2-50		3020
	75-100		3020 with adapter plates and back plate.
T1	2 05 04250 0425	:2	-
Joslyn	3-25 24352, 2435 24524	3 with adapter plat	e J6865
37-	1/2-50 24352, 243	53 (two needed)	J6864
	75-100 24352, 243	53 (two needed)	J6866
Turner	3-25		305-25
	37-1/2-50		305-100
	75-100		305-100
	For mounting of	two transformers	
Aluma-Form	3-100 3-50		DM-4M2
Chance	3-50		DM-2M2 C212-0001
Hughes	3-50		3022

Turner

3-50

dp - Clamp, ground wire

Transmission

For grounding steel towers and substation structures

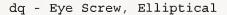
Bolt Included

(For use with copper ground wires)

Manufacturer	Catalog Number
Penn-Union	GH-30-C-A1
Royal Switchgear	12202-T (Type LCS)
Square D	GC-143AOZ

For use in: Pole Grounding Assembly TM-9
Capacitor Assemblies M9-11, M9-12 and M9-13

<u>Manufacturer</u>	For 5/8" Bolt	For 3/4" Bolt
Continental	SBL-33	-
Cooper Power Systems (McGraw-Edison)	DG1C5	DG1C6
Dixie	D-5452	-
Flagg (MIF)	PA-166A	-
Joslyn	J1163	J1164



For use in deadending triplex type service cable, Drawing K10C.

<u>Manufacturer</u>	<u>Catalog Number</u>
Cooper Power Systems (McGraw-Edison)	DF7E6
Joslyn	J8930



dr - Clevis, conduit, insulated

For use in deadending triplex service cable, Drawing K16C.

Applicable Specifications: "REA Specifications for Insulated

Conduit Clevises and Conduit Wire-

holders for Pipe Mast Deadends," D-16

Cooper Power Systems (McGraw-Edison)

DW8M1*

(------

J0311*

Joslyn



ds - Wireholder, conduit

For use in deadending open wire services on pipe masts, Drawing K17

Applicable Specifications: "REA Specifications for Insulated Conduit Clevises and Conduit Wireholders," D-16

Manufacturer	<u>Catalog Number</u>
Chance	C207-0075
Cooper Power Systems (McGraw-Edison)	DW2C5
Dixie	D-4010
Joslyn	J0588



ds - Wireholder, conduit

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	<u>Conditions</u>
<u>Joslyn</u> J0588Z (nylon alloy)	1480 01/25/94	To obtain experience.

dt - Deadend, service

For deadending triplex type service cable, Drawing K10C.

<u>Manufacturer</u>	A COD	<u>Catalog Number</u>	
	ACSR <u>Size</u>	Wedge Type	Formed Type
Blackburn	4	W62-1	
Carolina Forme	ed		
Wire	4		54-0225
	1/0		54-0361
	2/0	-	54-0401
Chance	4	-	AZSG-030
	2	-	AZSG-050
	1/0		AZSG-070
	2/0		AZSG-080
	3/0 4/0		AZSG-090
	4/0		AZSG-100
Dulmison	4		SG0570
	2		SG0735
	1/0		SG0915
	2/0		SG1020
Helical Line			
Products	4	-	HSG-514
	2	-	HSG-518
	1/0	-	HSG-522
Penn-Union	4	WDC-2S	-
Preformed Line	ž		
Products	4	-	SG-4502
	2	-	SG-4504
	1/0	-	SG-4506
	2/0	-	SG-4507
	3/0	-	SG-4508
	4/0	-	SG-4509
n-14-h3		T105	
Reliable	4 2	7195	-
	1/0	7187	-
	1/0	7287	-

du - Link, Extension

DISTRIBUTION

Manufacturer	<u>Catalog Number</u>
Atlas Power Products Chance Continental Cooper (McGraw-Edison) Flagg (MIF) Reliable/Bethea Utilities Service	APP-1180-H C207-0112 CEL-14 DC33B6 PA319 LCE-14 495

TRANSMISSION (25,000 lbs. min. strength)

Joslyn J26082 Reliable/Bethea Products ASM 7209-1-BC

Guy Extension Link (For "H" Structure)

Manufacturer	One Guy Attachment	Two Guy Attachment
Joslyn	J22421	J26025

NOTE: The distribution extension links may be substituted for anchor shackle (Item bo), eye bolt (Item o) and eye nut (Item aa) for both small and large conductor drawings shown in REA Form 803 and REA Bulletin 50-3 at the option of the owner.

du - Connecting Links for Pole Bands

Conditions - To obtain experience in conjunction with pole bands $\text{Item fv} \, (1)$

For Use With Medium Duty Pole Bands

<u>Manufacturer</u>	Link to <u>Insulators</u>	<u>Size</u>	Minimum Strength Rating	Meeting No. and Date
Hughes Bros.	3176	3/8"x3"x9-1/2"	25,00 lbs.	1432 09/26/91
Joslyn	J26034	3/8"x3"x9-1/2"	25,000 lbs.	1417 12/20/90
	Link to Guy			
Hughes Bros.	3154	3/8"x2"x9-1/2"	36,000 lbs.	1432 09/26/91
Joslyn	J26035	3/8"x3"x9-1/2"	36,000 lbs.	1417 12/20/90

For Use With Heavy Duty Pole bands

Manufacturer	Link to <u>Insulators</u>	<u>Size</u>	Minimum Strength Rating	Meeting No. <u>and Date</u>
Hughes Bros.	3157	3/8"x3"x12"	36,000 lbs.	1432 09/26/91
Joslyn	J26035 - 2	3/8"x3"x9-1/2"	36,000 lbs.	1417 12/20/90
	Link to Guy			
Hughes Bros.	3157	3/8"x3"x12"	51,000 lbs.	1432 09/26/91
Joslyn	J26037	1/2"x3"x12"	51,000 lbs.	1417 12/20/90

dy - Bolt, eye, double arming

Applicable Specification: ANSI C135.4, "Standards for

Galvanized Ferrous Eye Bolts and Nuts for Overhead Line

Construction."

Applicable Sizes : 5/8 inch, 14 through 26 inch length

3/4 inch, 14 through 26 inch length

The following manufacturers have shown compliance with the applicable specifications:

A. B. Chance Company
*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
Joslyn Manufacturing and Supply Company
Kortick Manufacturing Company
Utilities Service Company



^{*&}quot;Static proof" designs available.

dz - Clip, Guy Wire

<u>Manufacturer</u>	<u>5/16"</u>	3/8"	7/16"	1/2"
Chance	6453	6454	6455	6456
Cooper Power Systems (McGraw-Edison)	DJ17C6	DJ17C8	DJ17C10	DJ17C12
Utilities Service	4953	4954	4955	4956

ea - Insulator and Stud, post type

DISTRIBUTION

System voltage, kV Leakage, inches Flashover, dry, kV Flashover, wet, kV	12.5/7.2* 7-1/2 65 40	12.5/7.2* 10 70 50	24.9/14.4** 15 95 65
<u>Chance</u> 7"Stud 1-3/4" Stud	C903-1910-04 C903-1910-05	C903-1911-04 C903-1911-05	C903-1912-04 C903-1912-05
<u>Lapp</u> 7" Stud 1-3/4" Stud	4415P 4315P	4420P 4320P	4427P 4327P
Newell Porcelain 7" Stud 1-3/4" Stud		43570-7040 43570-7010	47101-7040 47101-7010
Porcelain Products (Knox) 7" Stud 1-3/4" Stud	5115-6510 5115-6500	5120-6510 5120-6500	5127-6510 5127-6500
	TRANSMISSION		
System voltage, kV ANSI Class Flashover, dry, kV Flashover, wet, kV	22 57-2 110 <u>85</u>	34.5 57-3 125 100	46 57-4 150 <u>125</u>
<u>Chance</u> 7" Stud 1-3/4" Stud	C903-1012-04 C903-1012-05	C903-1013-04 C903-1013-05	
<u>Lapp</u> 7" Stud 1-3/4" Stud	9435 9335	9445 9345	9455 9355
Newell Porcelain 7" Stud 1-3/4" Stud	37620-7040 37620-7010	41640-7040 41640-7010	41650-7040 41650-7010
Porcelain Products (Knox) 7" Stud 1-3/4" Stud	5135-6512 5135-6502	5145-6512 5145-6502	

NOTE: Post Insulators (item ea) may be substituted for the crossarm pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Bulletin 50-5 (Form 803) at the option of the owner.

^{*}The transverse loading on these insulators shall not exceed the lower of 40 percent of the insulator's ultimate strength and the maximum transverse loading given for the structure in REA Bulletin 50-3 (Form 804).

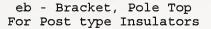
^{**}The transverse loading on these insulators shall not exceed 40% of the insulators' ultimate strength.

ea - Insulators, horizontal post type

<u>Manufacturer</u>	34.5 kV	<u>69 kV</u>	<u>115 kV</u>
Lapp	F-4745	F-4788	F-70147
Locke	-	LS02513	LS05013
Newell Porcelain	43740-7700	43790-7700	47043-7700
Victor Insulators, Inc.	62356	62359	-

ea - Insulator, post type

Manufacturer	Meeting No. <u>and Date</u>	<u>Conditions</u>
Victor Insulators, Inc.	000	
2120 (12.5/7.2 kV)	932	To obtain experience.
2127 (24.9/14.4 kV)	12/04/69	
62055 (22 kV)	1189	
62056 (34.5 kV)	06/19/80	



DISTRIBUTION

<u>Anderson/Square D</u>
(14.4 or 7.2 kV)
84324-2000

American Connector
(14.4 or 7.2 kV)
PTB-58

<u>Chance</u> (14.4 or 7.2 kV) 1B4

<u>Continental</u> (14.4 or 7.2 kV) PTB-55-8

Cooper Power Systems (McGraw-Edison)
(14.4 or 7.2 kV)
DC126B1

Flagg (MIF) (14.4 or 7.2 kV) P526

<u>Joslyn</u> (14.4 or 7.2 kV) J23333

<u>Lapp (Line Ware)</u> (14.4 or 7.2 kV) 304043

Line Hardware
(14.4 or 7.2 kV)
PTIB-375A

Reliable/Bethea (14.4 or 7.2 kV) BPT-58F

Universal Electric
(14.4 or 7.2 kV)
PT-8R

TRANSMISSION

Chance 1B4

Continental PTB-66H

Cooper Power Systems DP29A1 (McGraw-Edison)

Flagg (MIF) P532

Lapp (Line Ware) 304044

Reliable/Bethea BPT-58HF

NOTE: Pole top bracket (Item eb) and post insulator (Item ea) may be substituted for pole top pin (Item b) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

ec - Bracket, Offset Neutral

Chance	C206-000
Cooper Power Systems (McGraw-Edison)	DC6N1
Dixie	D-2353
Joslyn	J2352



ed - Support, overhead ground wire

Applicable Specifications: "REA Specifications for Overhead Ground Wire Support Brackets," T-2

Pole top diameter, inches	6-8	8-10	10-12
Chance	-	5432	5433
Dixie	-	-	D7760
Hughes Brothers	-	2859-12	2859-14
Joslyn	J6393	J6394	J6395
Kortick	K3580	K3581	K3582
Utilities Service	C1238	C1239	C1240







ef - Bolt, clevis

Applicable Specifications: "REA Specifications for Clevis Bolts,"

DT-7

	Dia. <u>Inches</u>	<u>8"</u>	10"	12"	14"
Chance	5/8	15808	15810	15812	15814
	3/4	15828	15830	15832	15834
Joslyn	5/8	J7808	J7810	J7812	J7814
	3/4	J7828	J7830	J7832	J7834



eg - Plate, crossarm reinforcing

TRANSMISSION

For 5-5/8" x 7-3/8" crossarm

Manufacturer	<u>Catalog Number</u>
Chance	4047
Hughes Brothers	1113.88
Joslyn	J22672.6
Utilities Service	3838

eh - Hook, ball

<u>Manufacturer</u>	Catalog Number
Anderson Elec./Square D	HB-30
Continental Electric Co.	BH-30-5
Flagg	13400
Joslyn (Brewer-Titchener)	3001-HT
Lapp	7055
Lindsey	3310
Line Hardware	BH-30
Reliable/Bethea	BH-5

*Clevis type available.

ei - Clamps, suspension with socket eye

ACSR with Straight or Formed Armor Rods

		AWG					kcmil		
	1/0 & 2/0	3/0	4/0	266.8	336.4	477	556.5	795	954
			30		į				
			TION OF SCEEL	ירפבו כומוווספ	SOL				
Anderson	MS-82-S	1	MS-104-S	MS-104-S	;	1	;	1	;
Chance	FGW4S	:	-	;	:	:	:	:	;
Lapp	3057438	;	:	;	;	;	1	1	;
Reliable/Bethea	FS-83-S	:	-	:	1 1	:	<u>.</u>	1	:
			ACSR with	. Straight	or Formed	ACSR with Straight or Formed Armor Rods			
		AWG					kcmil		
			ı						
	1/0 & 2/0	3/0 & 4/0_	ا	266.8	336.4	477	556.5	795	954
				1					
			Aluminum	Aluminum Alloy Clamp	dwe				
Anderson C & R Continental Dulmison Lapp *Preformed Reliable/Bethea	HAS-85-S CRSC-1S SC-85-S - 306029S - LS-1-S	HAS-104-S CRSC-2S SC-105-S HSU 306030S AGS LS-2-S		HAS-104-S CRSC-3S SC-105-S HSU 306030S AGS LS-2-S	HAS-104-S HAS-118-S CRSC-3S CRSC-3S SC-105-S SC-119-S HSU HSU 306030S 306031S AGS AGS LS-2-S LS-3-S	S HAS-139-S SC-136-S HSU 306032S AGS LS-4-S	HAS-147-S SC-149-S HSU AGS LS-6-S	HAS-182-S SC-177-S HSU AGS LS-7-S	HAS-182-S HAS-182-S SC-177-S SC-192-S HSU HSU AGS LS-7-S LS-8-S

ej - Clamps, deadend with socket eye

		954				: :	 ADE-24-S ADE-2526-S ADE-2526-S
		795				: :	 S ADE-252
	556.5				SD-86S	 ADE-24-	
	kcmi1	477			pe or liner)	SD-86-S	305760S ADE-24-S
		336.4	ape or liner)	80445-2000	quire armor ta	SD-70-S	305759S ADE-23-S
ACSR	266.8	Iron or Steel Clamps (require armor tape or liner)	80445-2000	Aluminum Alloy Clamps (do not require armor tape or liner)	SD-70-S	305758S ADE-22-S	
	AWG	2/0 to 4/0	Iron or Steel Clan		Aluminum Allo	SD-57-S	305757S ADE-21-S
				Anderson/Square D		Anderson/Square D	Lapp Reliable/Bethea

NOTE: When used with clevis-type insulators for large conductors on distribution lines, order clamp with clevis eye.

ek - Locknuts

For Bolt Diam., in.:	3/8	1/2	5/8	3/4	7/8
		MF Type			
Chance	3510	3511	3512	3513	3514
Cooper Power Systems (McGraw-Edison)	DF3N1	DF3N2	DF3N4	DF3N6	DF3N8
Dixie	D3510	D3511	D3512	D3513	
Hughes Brothers	MF30	MF50	MF60	MF70	
Joslyn	J8581	J8582	J8583	J8584	J8584-1/2
Kortick	K1065	K1066	K1067	K1068	
Line Hardware	SLN38	SLN50	SLN58	SLN34	SLN78
Utilities Service	4920	4921	4922	4923	4924

el - Sectionalizer

Manufacturer

Cooper Power Systems (McGraw-Edison(Kyle))

Type

GH (with crossarm mounting bracket KA27G)

el - Sectionalizer

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
A. B. Chance Sectionalizer, single-phase Type CES 15 kV, 95 kV BIL 200 amp max. 27 kV, 125 kV BIL 200 amp max. 38 kV, 150 kV BIL 200 amp max.	1402 04/12/90	To obtain experience.
Cooper Power Systems (McGraw-Edison) Sectionalizer, three-phase) Type GN3 Sectionalizer with 125 kV BIL accessory Type GH, 15 kV, single phase	663 03/12/59 1046 07/25/74	To obtain experience. 1. To obtain experience. 2. For use on single-phase taps of 24.9/14.4 kV multi-grounded wye systems.
*Sectionalizer, three-phase Type GN3E 14.4 kV, 200 amp max.	1153 12/21/78	To obtain experience.
*Sectionalizer, three-phase Types GV and GVC 14.4 kV, 400 amp. max.	1153 12/21/78	To obtain experience.
*Sectionalizer, three-phase Types GW and GWC 34.5 kV, 400 amp. max.	1153 12/21/78	To obtain experience.
General Electric Sectionalizer, single-phase cutout-type - 15 kV and 25 kV Model 9F41F	1471 07/22/93	1. To obtain experience.
<u>Joslyn</u> Sectionalizer, three-phase, 15 kV, 400 and 600 amperes 25 kV, 600 amperes	1042 05/30/74	To obtain experience.
Model VBM with VT or RS control	1358 03/03/88	To obtain experience.

*NOTE: Ratings greater than 100 ampere for 12.5/7.2 kV application and greater than 200 ampere for 24.9/14.4 kV application are acceptable only with ground trip device.

NOTE: Cutout type sectionalizers may also be used with cutout frames listed on pages af-1 and ax-1. Consult manufacturer for application.

em - Brace, crossarm, special (angle alley arm)

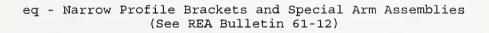
DISTRIBUTION

15" span, 14" drop; 1-1/2" x 3/16"

Cooper Power Systems (McGraw-Edison)	DB4L1
Dixie	D17939
Joslyn	J1415
Kortick	K1978
Utilities Service	5514

TRANSMISSION

2′-6	5" span x 1'-8" drop 1-3/4" x 3/16"	3'-6" span x 2'-3" drop 1-3/4" x 3/16"
Chance		6999
Cooper Power Systems (McGraw-Edison)	DB4L3	DB4L4
Hughes Brothers	AS-2309-B	AS-2309-A
Joslyn	J1430	J1442
Kortick	K1975	K1976
Utilities Service	5509	5510



METAL BRACKETS

Manufacturer	Meeting No. _and_Date	Conditions
Anderson/Sq. D Standoff bracket, COB-E-180-TGL	1180 01/31/80	 To obtain experience. For use only in scenic areas and locations where right-of-way is limited. Not to be used where conductor galloping may be expected.
Chance Single post insulator brackets C206-0209 for 12.5/7.2 kV construction only C206-0010 for 24.9/14.4 kV construction Deadend bracket assembly, C206-0179 Deadend bracket	1049 09/05/74 1081 01/08/76	Same as above.
assembly, C206-0211 for 24.9/14.4 kV construction Continental Standoff bracket IACB-18-5	1065 05/15/75	Same as above.
<pre>Dixie Deadend bracket assembly D21142 for 12.5/7.2 kV Deadend bracket</pre>	1220 10/08/81	Same as above.
assembly D21144 for 24.9/14.4 kV		
Flagg (MIF) Single post insulator bracket, P542 Deadend bracket assembly, PAX188A Deadend bracket assembly, PAX188M for 24.9/14.4 kV construction	1032 12/20/73 1044 06/27/74	Same as above.
Standoff bracket, PA619B	1048 08/22/74 1335 02/05/87	

eq - Narrow Profile Brackets and Special Arm Assemblies (See REA Bulletin 61-12)

METAL BRACKETS

Manufacturer	Meeting No. and Date	Conditions
Joslyn Single post insulator brackets 24840.1, for 12.5/7.2 kV construction only 24840.2, for 24.9/14.4 kV construction	1043 06/13/74	 To obtain experience. For use only in scenic areas and locations where right-of-way is limited.
		 Not to be used where conductor galloping may be expected.
Reliable/Bethea Single post insulator bracket, HBF-10-9-GC Standoff bracket VIB3-18-GC	1156 02/01/79 1213 06/04/81 1278 04/12/84 1371 10/06/88	Same as above.
<u>Universal Electric</u> Single post insulator bracket, SAB-3-18-GC	1271 12/15/83	Same as above.
Western Power Products Single post insulator bracket, HDB-200-R, for 12.5/7.2 kV construction only.	1152 12/07/78	Same as above.

eq - Narrow Profile Brackets and Special Arm Assemblies (See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC For 12.5/7.2 kV

<u>Manufacturer</u>	Meeting No. <u>and Date</u>		<u>Conditions</u>
Atlas Power Product			
Single phase insulator bracket APF-813	1435 11/07/91	1.	
		3.	Not to be used where conductor galloping may be expected.
		4.	Not to be used in contaminated atmospheres.
<u>Chance</u>			
Two-phase pin bracket C653-0638 Standoff insulator C653-0621 Deadend arm C653-1023	1043 06/13/74 1049 09/05/74 1141 06/15/78		Same as above.
<u>Continental</u> .			
Two-phase pin bracket GPB2-568M-36V Two-phase angle bracket GPB2-568M-36E Standoff insulator GPB-58M-13 Standoff insulator GPB-58M-18	1181 02/14/80		Same as above.
Deadend arm GDEA-58-3.0-36-2E Suspension bracket GPB-58M-18E			

eq - Narrow Profile Brackets and Special Arm Assemblies (See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC For 12.5/7.2 kV

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
Flagg (MIF)		
Two phase angle bracket 7561-336E Two phase pin bracket 7561-436 Standoff insulator	1201 1. 12/04/80 2.	To obtain experience. For use only in scenic areas and locations where the right-of-way
7561-012 Standoff insulator 7561-018 Suspension bracket 7561-818	3.	is limited. Not to be used where conductor galloping may be expected.
Standoff bracket 7561-218 Deadend arm 7554-636-4E	1272 01/05/84	Not to be used in contaminated atmospheres.
Hughes Brothers		
Two-phase angle bracket 761-36-8 Two-phase pin bracket 813-36 Standoff insulator, 560-13 Standoff insulator, 560-18 Suspension bracket, 615-18	1032 12/20/73 1294 02/14/85	Same as above.
Deadend arm, 540-36 Standoff bracket, 892-18	1063 04/17/75 1089 04/29/76	
Reliable/Bethea		
Two-phase pin bracket 6742-36P Standoff insulator bracket 6745-13P Standoff insulator bracket 6745-18P	1285 08/16/84 1371 10/06/88	Same as above.

eq - Narrow Profile Brackets and Special Arm Assemblies (See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC For 24.9/14.4 kV

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Two-phase pin bracket C653-0987	1049 09/05/74	1. To obtain experience.
Standoff insulator C653-0988 Deadend arm	1141	 For use only in scenic areas and locations where right-of-way is
C653-1024	06/15/78	limited.
		 Not to be used where conductor galloping may be expected.
		 Not to be used in con- taminated atmospheres.
<u>Continental</u>		
Two-phase pin bracket GPB2-568M-44V-1.375 Two-phase pin bracket	1181 02/14/80	Same as above.
GPB2-558H-48-V-1.375 Standoff insulator GPB-58M-19-V-1.375	1272 01/05/84	
Standoff insulator GPB-58H-20-V-1.375 Standoff bracket		
GPB-5568M-18-GIACB Deadend arm GDEA-58-3.0-48-2E	1439 01/09/92	
Flagg (MIF)		
Standoff insulator 7581-120X Standoff insulator	1201 12/04/80	Same as above.
7561-118X		
Two-phase pin bracket 7561-448X Standoff bracket	1272 01/05/84	
7561-218 Deadend arm		

7554-648-4E

6748-20P-1.375

Two-phase pin bracket 6742-44P-1.375 Two-phase pin bracket 6747-48P-1.375

eq - Narrow Profile Brackets and Special Arm Assemblies (See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC For 24.9/14.4 kV

<u>Manufacturer</u>	Meeting No. <u>and Date</u>		<u>Conditions</u>
Hughes Brothers			
Deadend arm, 540-48 Standoff insulator, 880-20	1063 04/17/75	1.	To obtain experience.
Two-phase pin bracket, 883-48 Standoff insulator, 870-19 Two-phase pin bracket, 862-44 Standoff bracket, 892-18	1081 01/08/76 1089 04/29/76 1294 02/14/85	2.	For use in only scenic areas and locations where right-of-way is limited.
	02/ 21/ 03	3.	Not to be used where conductor galloping may be expected.
		4.	Not to be used contaminated atmospheres.
Reliable/Bethea			
Standoff insulator bracket 6882-18P Standoff Insulator Bracket 6744-19P-1.375 Standoff insulator bracket	1285 08/16/84 1307 10/10/85 1371		Same as above.

10/06/88

eq - Narrow Profile Brackets and Special Arm Assemblies (See REA Bulletin 61-12)

WOOD ARM ASSEMBLIES

<u>Manufacturer</u>	Meeting No. and Date	Conditions
Aluma-Form Arm assembly, 12.5/7.2 kV XA-3812 Arm assembly, 24.9/14.4 kV XA-4214	1038 04/04/74	 To obtain experience. For use only in scenic areas and locations where right-of-way is limited.
		Not to be used where conductor galloping may be expected.
		 Not to be used as deadend structures.
<u>Hughes Brothers</u> Deadend arm, 2890-J complete with braces	1065 05/15/75	1. To obtain experience.
and attaching hardware, fittings and bolts	03/13/73	 For use only in scenic areas and locations right-of-way is limited.
		Not to be used where conductor galloping may be expected.

eq - Narrow Profile Brackets and Special Arm Assemblies (See REA Bulletin 61-12)

COMBINATION INSULATORS AND BRACKETS

<u>Manufacturer</u>	Meeting No. _and Date	<u>Conditions</u>	
Salisbury Horizontal Post	1305 08/22/85	1. To obtain experience.	
12.5/7.2 kV, 9561 24.9/14.5 kV, 9562		 For use only in scenic areas and locations when right-of-way is limited 	
		Not to be used where conductor galloping may expected.	be
		4. Not to be used in	

contaminated atmospheres.

er - Wire Guard, Plastic

See Drawing M-24

Type or Catalog Number Manufacturer

Chance PFG

Fargo GM-936

Preformed Line Products (Tree Guard) PTG

es - Splice Cover, Plastic

(For use over compression type service connections in place of tape.)

Manufacturer Type

Anderson/Square D Type SEC

Kearney Type 601

Plastic Engineering & Sales Co. Wire Splice Cover

3M PST Series 8420

Virginia Plastics Type VP

Splice Cover and Moisture Seal for Secondary Cable Connections (See Drawings G312 and UM5)

<u>Manufacturer</u> <u>Type</u>

AMP Sealing & Dielectric

Compound

Plymouth/Bishop 10 Plyseal

3M Scotch Brand #2200

Bolted Connector Cover

(For use over bolted type service connections in place of tape.)

<u>Manufacturer</u> <u>Type</u>

Fargo GA-9000 B Series

Anderson/Square D PTC

eu - Extension Link (Fiberglass) (Distribution)

<u>Manufacturer</u>	Strength	Catalog Number
Anderson/Square D	10,000 lbs. 15,000 lbs.	*GSB1-9 GSB2-12
Atlas Power Products	11,000 lbs. 15,000 lbs.	APF-100 Series APF-100 Series
Continental	11,000 lbs. 15,000 lbs.	*GEE11-12 GEE15-12
Dulmison	11,000 lbs. 15,000 lbs.	*HSB-1-12 HSB-2X-12
Flagg (MIF)	11,000 lbs. 15,000 lbs.	150-12EE 150-12EE
K-Line	15,000 lbs.	KL Series
Reliable/Bethea	11,000 lbs. 15,000 lbs.	FGS16-EE-12P FGS16-EE-12P

^{*}For use with 6" suspension insulators.

ex - Splice, formed type

Manufacturer	Meeting No. _and_Date	<u>Conditions</u>
Preformed Line Products Splice for ACSR FTS full tension splice	654 10/16/58	To obtain experience.
Splice for AWAC LS-0185 for 4-4/3	999 08/31/72	For repair only.
LS-0188 for 2-4/3 LS-0191 for 1/0-4/3		To obtain experience.
		For repair only where alumoweld strands are not broken.

fc - Capacitors, Shunt 12470/7200 Volts

<u>Manufacturer</u>	<u>Size</u>	1 Bushing	2 Bushing	3 Bushing
ABB	100 kvar 150 kvar 200 kvar 300 kvar 400 kvar	A10009 A15009 A20009 A30009 A40009	A10010 A15010 A20010 A30010 A40010	
Cooper Power Systems (McGraw-Edison)	100 kvar 150 kvar 200 kvar 300 kvar	CEP131B6 CEP132B6 CEP140B6 CEP160B6	CEP131A6 CEP132A6 CEP140A6 CEP160A6	
General Electric Film/Foil Type	25 kvar 50 kvar 100 kvar 150 kvar 200 kvar 300 kvar	52L226RC 51L226RC 54L226RC 54L526RC 58L126RC 59L226RC	52L206RC 51L206RC 54L206RC 54L506RC 58L106RC 59L206RC	59L611RC

24900/14400 Volts

Manufacturer	<u>Size</u>	1 Bushing	2 Bushing	3 Bushing
ABB	100 kvar 150 kvar 200 kvar 300 kvar 400 kvar	A10031 A15031 A20031 A30031 A40031	A10032 A15032 A20032 A30032 A40032	
Cooper Power Systems (McGraw-Edison)	100 kvar 150 kvar 200 kvar 300 kvar	CEP138B4 CEP137B4 CEP142B4 CEP162B4		
General Electric Film/Foil Type	50 kvar 100 kvar 150 kvar 200 kvar 300 kvar 400 kvar	51L252RC 54L252RC 54L552RC 58L154RC 59L154RC 98L154RC		

fd - Hangers, Capacitor

Crossarm Mounting

	1 unit	2 units	3 or 4 units
ABB	85B397G01	791C644G01	791C644G02
Cooper Power Systems (McGraw-Edison)	CH1A1	CH2A2	CH4A1
General Electric	39F41G2	39 F 53	39F80G1

Pole Mounting

	Single Phase	Three Phas	<u>se</u> <u>Cluster</u>
ABB	AL30R (3 units) AL60R (6 units)	(1 units) AL30R AL60R AL90R (3 units) AL13W AL23W AL23W AL33W AL43W AL53W	(3 units) (6 units) (9 units) (1 unit) (2 units) (3 units) (4 units) (5 units)
Aluma-Form	CR-3* thru CR-6*	CR-3/4*	3-CR-3/4*
General Electric	39F41G1 (1 unit) 39F83G1 (3 units)	39F86G1	
Joslyn	J6744, J6744A		

^{*} Available with oil switch mounting bracket.

fg - Crossarm Saddle

 $(3-3/4" \times 4" \text{ with } 1-1/4" \times 1/4" \text{ flange})$

Manufacturer Catalog Number

Lapp 10369

fi - Connectors, hot line

Over Armor Rods

<u>Manufacturer</u>	Catalog Number or Series <u>(Al to Al)</u>	Catalog Number or Series <u>(Al to Cu)</u>
Anderson	AC Series	AC-GP-Series
Blackburn	PGH	-
Fargo Series	GA-100 Series	GA-100C

fj - Bracket, extension

(For use in mounting oil circuit reclosers or sectionalizers)

See Drawing VM3-10A

Through Bolt

Type Band Type

Aluma-Form TBRSM-1, TB2M1-9* RSM-1

Cooper Power Systems DR2E3

(McGraw-Edison)

Dixie D-2359-M

Joslyn J2357

*For mounting double lug reclosers.

fk - Bracket, oil circuit recloser or sectionalizer

(For cluster mounting of three oil circuit reclosers on pole)

Aluma-Form RSM-3, 6M3-9*

*Cooper Power Systems

(McGraw-Edison)

DT8C1

Turner 695-3

*Suitable for 14.4 and heavy duty 7.2 kV.

fl - Rack, primary metering

(For cluster mounting of primary metering equipment on pole)

Aluma-Form PMM Series

Turner 3CT-PT

fm - Bracket, Arrester and Pothead Extension

For Distribution Arrester and Cutout - Pole Mounting

<u>Manufacturer</u>		Single Phase	Three Phase
Aluma-Form		1HCA-18 Series	R3CA-48
American Connector Engineering	12.5/7.2 kV 24.9/14.4 kV	EMB-3-12-GC EMB-3-18-GC	
Anderson/ Square D	12.5/7.2 kV 24.9/14.4 kV	COB-E-120-TGL ACOB-E-180	
Atlas Power Products	24.9/14.4 kV 12.5/7.2 kV	APP-2312 APP-577	12.5/7.2 kV APF-3730-13 24.9/14.4 kV APF-3740-13
Chance		C653-1038	C653-1056
Continental	12.5/7.2 kV 24.9/14.4	IACB-12-5LGE IACB-18-5LGE	GPB-3-0-568M-3012-CAT 12 GPB-3-0-568M-4017-CAT 12
Cooper Power Syste (McGraw-Edison		DC34B3	
Dixie	12.5/7.2 kV 24.9/14.4 kV	D-1580 D-1583	D27211-G
Flagg (MIF)	12.5/7.2 kV 24.9/14.4 kV	PA613B PA619B	7510-730 7510-740-17
Hughes Brothers		892-18	670-40
Joslyn	12.5/7.2 kV 24.9/14.4 kV	J26190 J26191	
Line Hardware	12.5/7.2 kV	CA-12-3GL	
Reliable/ Bethea	12.5/7.2 kV 24.9/14.4 kV	VIB3-18-R1-GC-C VIB3-18-GC	
Universal Electric	:	SAB-3-18-GC	
Utilities Service	Co. 12.5/7.2 kV 24.9/14.4 kV	5936D 5952D	

For two distribution arresters in parallel or one arrester and cutout - crossarm mounted

Manufacturer Catalog No.

Cooper Power Systems (McGraw-Edison)

DM23B1

For Intermediate Arrester Mounting

ManufacturerSingle PhaseThree PhaseAluma-FormWBMA-1R3CSA-48

Reliable/Bethea 12.5/7.2 kV VIB3-18-R1-GC-C

fn - Bracket, Cutout Extension

Manufacturer		Catalog Number
Aluma-Form		1HCA-C-18
American Connector Engineering	12.5/7.2 kV 24.9/14.4 kV	EMB-3-12-GC EMB-3-18-GC
Anderson Elec./ Square D	12.5/7.2 kV 24.9/14.4 kV	COB-E-120-TGL COB-E-180-TGL
Atlas Power Products		APF-3418
Chance		C653-1038
Continental	12.5/7.2 kV 24.9/14.4 kV	IACB-12-5-LGE IACB-18-5-LGE
Cooper Power Systems (McGraw-Edison)		DC34B1
Flagg (MIF)	12.5/7.2 kV 24.9/14.4 kV	PA613B PA619B
Hughes Brothers		892-18
Line Hardware	12.5/7.2 kV	CA-12-3GL
Reliable/Bethea	12.5/7.2 kV 24.9/14.4 kV	VIB3-12F-GC VIB3-18-GC
Universal Electric		SAB-3-18-GC

fo - Bracket, Transformer Secondary, Insulated

Manufacturer <u>Insulator</u>	Bracket Without Insulator	Bracket With 2-1/4" Diameter Spool Insulator	Bracket With 3-1/8" Diameter Spool
Chance	-	9113S	9114S
Cooper Power Systems (McGraw-Edison)	DT4M1	DT4M13	DT4M11
Joslyn	-	J6765-A	J6765
Utilities Service	865	865/208	865/205

fp - Oval Eye Ball
(30,000 lbs; to be used with 52-3 and 52-5 insulators)

Manufacturer No.

Flagg 13000

Joslyn BTJ 3014

Conditional List fq(1) July 1994

fg - Laminated Upswept Arms

Applicable Specification: REA Specification DT-5B Applicable Drawing: REA Drawing TUS-1

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	Conditions
Hughes Brothers Types: C-4080A (5-1/8" width) C-4080B (5-1/8" width)	1095 08/11/76	1. To obtain experience.
C-4113A (3-1/8" width) C-4113B (3-1/8" width)	1113 04/28/77	 For use only in scenic and urban areas where right- of-way is limited.

<u>Manufacturer</u> <u>Catalog Number</u>

Flagg PA392

fs - Pole Bearing Plate

Manufacturer	Meeting No. <u>and Date</u>	<u>Conditions</u>
Continental PB-80-7	1114 05/12/77	1. To obtain service and operating experience on cross-braced transmission structures.
		2. For determining corrosion resistance.
		3. For determining structure uplift capability of the pole under various soil and moisture conditions.
<u>Dixie</u> D-6370-GR	1210 04/16/81	Same as above.
Flagq (MIF) P325B	785 02/20/64	Same as above.
<u>Reliable/Bethea</u> PBP-156-7	1070 07/24/75 1278 04/12/84 1371 10/06/88	Same as above.

ft - Y-Clevis Ball

Manufacturer Catalog Number

Joslyn BT 3030

Flagg 13202F

fu - Swinging angle bracket and guying plate

(TRANSMISSION)

Manufacturer Catalog Number

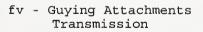
Joslyn J22712.3 (Bracket and guy plate)
J22714 (plate only)

Swinging angle bracket

Applicable Specification: T-8

Swinging angle bracket with hardware and fittings

Manufacturer	2' - 0"	3' - 6"	Type #1	Type #2
Brooks	64233A	64233B	х	
Hughes Brothers	2848	2848	x	х
Joslyn	REA 64-8A	REA 64-8B	х	



<u>Pole Eye Plates</u>*
25,000 lbs. 90⁰/36,000 lbs. 45⁰

Manufacturer	Single Eye 3/4" Bolts 7/8" Bolts	Double Eye 7/8" Bolts
Continental	EPR-66S-12	
Flagg (MIF)	PX37D	PX42

^{*}Capacity of pole eye plate

Medium Duty Pole Bands

25,000 lbs @ 90^o/36,000 lbs @ 45^o*

Manufacturer	Pole Band and <u>Associated Hardware**</u>	Meeting No. <u>and Date</u>	<u>Conditions</u>
Hughes Bros.	3108.x-2718.55	1432 09/26/91	To obtain experience.
Joslyn	J25968. x GL	1417 12/20/90	To obtain experience.

Heavy Duty Pole Bands

 $36,000 \text{ lbs. } @90^{\circ} /51,000 \text{ lbs. } @45^{\circ}*$

Manufacturer	Pole Band and <u>Associated Hardware**</u>	Meeting No. <u>and Date</u>	Conditions
Hughes Bros.	3107.x-2718.55	1432 09/26/91	To obtain experience.
Joslyn	J25988. x GL	1417 12/20/90	To obtain experience.

^{*} For a guy lead greater than 1/1, capacity of pole band should be derated.

^{**} Associated hardware includes through bolt, band connecting bolts, nuts, grounding clip and lag screws (if any). Connecting links (Item du (1)) of the required strength should be ordered separately from the same manufacturers.

* Type J4ES for Class 320

ga - Watthour and Watthour-Demand Meters 1ϕ , 2 and 3 wire or 2/3 wire 120/240 volts

(Classes 100, 200, 10, and 20)

Self-Contained Types	ര്]				
Manufacturer 1	Type of Base 2	Watthour Meter Type 3	Mechanical Demand Watthour Type 4	Thermal Demand Watthour Type 5	Number of Terminals 6
ABB	Bottom Con. Socket	_ AB1	1 1		। प
General Electric	Bottom Con. Socket	I50A I70S	IM50A IM70S	1-1	작 작
Landis & Gyr	Bottom Con. Socket	- W	- BMS-2S	- TMS	1 4 4
Schlumberger	Bottom Con. Socket	J58A J58*	JSDSA JSDS	1 1	। ব
Franch (vec)					
ABB Soon Soon Soon Soon Soon Soon Soon So	Bottom Con. Socket	AB1		1.1	5 or 6
General Electric	Bottom Con. Socket	150A 170S	IM50A IM70S		5 or 6 5 or 6
Landis & Gyr	Bottom Con. Socket	- W	- BMS	- TMS	- 5 or 6
schlumberger	Bottom Con. Socket	JSSA JSS	JSDSA JSDS		- 5 or 6

ga - Watthour and Watthour-Demand Meters Polyphase 2 element - 3 wire, 240 volts - Delta and 120/208 Volts Network

(Classes 100, 200, 10, and 20)

Types
tained
lf-Con
S

Manufacturer 1	Type of Base 2	Watthour Meter Type	Mechanical Demand Watthour Type 4	Thermal Demand Watthour Type	Number of Terminals 6
	Bottom Con. Socket	- ABS-5	1 1	1 1	1 1
General Electric	Bottom Con. Socket	V62A V62S	VM62A VM62S	1 1	и і
	Bottom Con. Socket	- MT012S or 13S	- BMT-12S or 13S	TMT-12S	- 5 or 8
	Bottom Con. Socket	SL2A SL2S SL12S	SL2DA SL2DS SL12DS	1 1	5 0 r 8
ted 7	Transformer Rated Types				
	Bottom Con. Socket	ABA-2 ABS-2	1 1	1 1	1 00
General Electric	Bottom Con. Socket	V63A V63S	VM63A VM63S	1 1	ω ι
	Bottom Con. Socket	MT-5A MT-5S	BMT-5A BMT-5S	TMT-5A TMT-5S	ω ω
	Bottom Con. Socket	SL3A SL3S	SL3DA SL4DS	1 1	ιœ

ga - Watthour and Watthour-Demand Meters Polyphase 2 element - 4 wire Delta - 120/240 volts

(Classes 100 or 200)

Self-Contained Types	rol				
Manufacturer 1	Type of Base 2	Watthour Meter Type 3	Mechanical Demand Watthour Type 4	Thermal Demand Watthour Type	Number of Terminals 6
АВВ	Bottom Con. Socket	ABA-7 ABS-7	1 1	1 1	7 or 8
General Electric	Bottom Con. Socket	V66A V66S	VM66A VM66S	1 1	7
Landis & Gyr	Bottom Con. Socket	_ MT-15S	- BMT-15S	_ TMT-15S	7
Schlumberger	Bottom Con. Socket	SL6A SL6S	SL6DA SL6DS	1 1	7 or 8

Transformer Rated Types

ABB

General Electric

Landis & Gyr

Schlumberger

Not shown in REA Bulletin 161-12

	Polyphase	ga - 2-1	nd Watthour-Den 4 wire wye -	nand Meters (120/208) (277/480) volt	
		(Classes 1	(Classes 100, 200, 10, and 20)		
Self-Contained Types	8				
Manufacturer 1	Type of Base 2	Watthour Meter Type 3	Mechanical Demand Watthour Type	Thermal Demand Watthour Type	Number of Terminals
ABB	Bottom Con. Socket	ABA-8 ABS-8	1 1	1 1	1 1
General Electric	Bottom Con. Socket	V65A V65S	VM65A VM65S	1 1	7 -
Landis & Gyr	Bottom Con. Socket	- MT-14S	BMT-14S	- TMT-14S	7
Schlumberger	Bottom Con. Socket	SL5A SL5S	SL5DA SL5DS	1 1	- 7 or 8
Transformer Rated Types	lypes				
АВВ	Bottom Con. Socket	ABA-8 ABS-8	1.1	1-1	13
General Electric	Bottom Con. Socket	V65A V65S	VM65A VM65S	1 1	7 or 13
Landis & Gyr	Bottom Con. Socket	MT-6A MT-7S or 6S	BMT-6A BMT-7S or 6S	TMT-6A TMT-7S or 6S	10 7 or 13
Schlumberger	Bottom Con. Socket	SL5A SL5S	SL5DA SL5DS	1 1	13

ga - Watthour and watthour-Demand Meters

Polyphase - 3 element - 4 wire wye - (120/208) (277/480) volt

(Classes 100, 200, 10, and 20)

Self-Contained Types	୬				
Manufacturer 1	Type of Base 2	Watthour Meter Type 3	Mechanical Demand Watthour Type 4	Thermal Demand Watthour Type 5	Number of Terminals
ABB	Bottom Con. Socket	ABA-3 ABS-3	1 1	1 1	7 or 8
General Electric	Bottom Con. Socket	V64A V64S	VM64A VM64S	1 1	7 or 8
Landis & Gyr	Bottom Con. Sacket	- MT-16S	- BMT-16S	1 1	- L
Sangamo	Bottom Con. Socket	S4A S4S	S4DA S4DS		7 or 8
Transformer Rated Types	Types				
ABB	Bottom Con. Socket	ABA-3 ABS-3	1 1		1 1
General Electric	Bottom Con. Socket	V64A V64S	VM64A VM64S		13
Landis & Gyr	Bottom Con. Socket	MT-9A MT-9S or 10S	BMT-9A BMT-9S or 10S	1 1	12
Sangamo	Bottom Con. Socket	SL4A SL4S	SL4DA SL4DS		13

ga - Meters, Min/Max Indicating

Ammeters Indicating

Manufacturer	Type	<u>Description</u>
Biddle	50,000 Series	Thermal, Max Pointer
ED Electric	Max-I-Meter (all models)	Thermal Ammeter
Schlumberger	ADS	Thermal Ammeter

Voltmeter, Min/Max

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>
Appalachian Electronic Instruments	LVM-100	Digital min/max averaging voltmeter
Demico	AV121R	Digital min/max voltmeter
Bitronics	VMAMC1	Digital Demand min/max voltmeter

ga - Watthour and Watthour-Demand Meters

Manufacturer	Meeting No. and Date	Conditions
Landis & Gyr Special base, 3 wire, 1 watthour meter, Type MS-K,	947 07/09/70	1. To obtain experience.
Class 400 watthour and mechanical demand Type BMS-K watthour and thermal demand Type TMS-2K	1113 04/28/77	 To be used only where Class 400 meters are permitted by local regulatory bodies.
Socket base, 3 wire, 1 watthour meter, Type MS-E, Class 300	1113 04/28/77	1. To obtain experience.
, , ,		 To be used only where Class 300 meters are permitted by local regulatory bodies.

ga - Watthour and Watthour-Demand Meters Solid State Registers

Manufacturer	Meeting No. <u>and Date</u>	<u>Conditions</u>
ABB		
Solid State Polyphase Watthour meter, Alpha line, A1, A and S type bases (all forms) Class 20 and 200, 120, 240, 277, and 480 V	1464 03/25/93 1469 06/14/93	1. To obtain experience.
Landis & Gyr		
Solid State Watthour Meter Type DDS2, Form 5S, 6S, 8S, 9S, 10S, Class 20.	1441 02/13/92	1. To obtain experience.

Type or Catalog Number

Rating Amps.	100 200/400** 1¢ 3w 200/400** 3¢ 3w 200/400** 3¢ 4w Y or Delta 200/400** 3¢ 4w Delta	200/400** 30 4w Y 200/400 30 3w 200/400 30 4w Y Or Delta 200/400 30 4w Delta 200/400 10 3w	100 150 200 200 320	100/125 per sta. 150 per sta. 200 per sta. 20/100	100 100 200 200 HD
No. Jaws	5, 5, 8, 8 13	8 OF 13	,44,4 v,4,4 v,0,v,	4, 5 4, 5 4, 5, 6, 7, 8, 13	4,4,4,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
Ringless		STA-2 STA-3 STA-7 STA	1000 Series (1003-1006) 1100 Series (1100-1109) 1200 Series (1201-1209) 1200/1300 Series (1275-1300) 1600 Series (1600-1661)	Series Series Series Series (Series	RJ Series* (Single) RN Series* (Single) RS Series* (Single) RH Series* (Single)
Ring	#S STS STS-2 STS-3 STS-7	8 - 9.7.9 1.0.7.9	1000 Series (1003-1006) 1100 Series (1100-1109) 1200 Series (1201-1209) 1600 Series (1600-1661)	(1500-1 (1530-1 (1540-1 (1405-1	SJ Series* (Single) SN Series* (Single) SS Series* (Single)
Manufacturer	АВВ		Anchor#		Murray

#Available with UL label *UL label

gb - Meter Sockets

Rating, Amps.	150	320	100	200	7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0000 0000 8888	1000 2000 200	100-200, 20 100 20	100	100-200	200 HD 20	200 200 200
No. Jaws	4 or 5	4, 5, 7	4 or 5	4 or 5	44 44 44 전 역 역 역	4444 পুপুপু টেডাটো	4,4,4, ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,	7, 8, 13 4, 5, 6 5, 6	4, 5, 6	10.10	4, 5, 7 6, 7, 8, 13	4, 5, 6 4, 5, 7 4, 5, 7
Ringless	RS502# RS512#	H-4300 Series# H-5300 Series# H-7300 Series#	RS101-6R111# 2R1121-6R1131# 2B1421-6F1431#	RS202# RS212, RS213# RS220-RS233# 2R2332-6R2392#	1000-C - 1007-C 1200-C - 1207-C 2000-CH-2007-CH 2200-CH-2207-CH	2590-CHU-2597-CHU 2790-CHU-2797-CHU 2090-CHU-2097-CHU 2290-CHU-2297-CHU	SI-73# SI-73# for	SV-60# SI-60# SI-60		AS Series A2 thru A6 Series (Multiple Mou	HO# HO-T	RSU# CQ-U# HQ-U#
Type or Catalog Number					Overhead	Underground		Unaergrouna		<u>Overhead</u>	Underground	
Type or Ring	R-RS512		RS101-RS111# 2R1121-6R1131# 2D1421-6D1431#	ALTECT OF TEACH RS201# RS212, RS213# RS220-RS233# 2R2332-6R2392#	1100-C - 1107-C 1300-C - 1307-C 2100-CH-2107-CH 2300-CH-2307-CH		R-2#		42100 Series*	AS Series		
<u>Manufacturer</u>	Durham				Dyna-Tech		General Electric		General Switch	Landis & Gyr		

*UL Label #Available with UL label

Rating, Amps.	66	<u> </u>
Rating	100 100 150 200 200 (HD) 200 (HD)	100 150 200 200 (HD) 200 (HD)
IWS	10.10.10.10.10	ហហហហ
No. Jaws	4444 2007 2007 2007 2007 2007	4 4 4 4 4 4 4 0 C C C C C C C C C C C C
	. 4. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	
Ringless	S7462, 3,4,5,6 U7362*, 3,4,5,6 R7486 Series* U7262 Series* U7021 Series* U9550 Series* U9700 Series*	U8086-XL* U8084-XL* U7040-XL* U9551-XL* U9701-XL*
Rin	S74 U73 U70 U95 U95	080 080 070 095 095
Number		<u>pur</u>
Type or Catalog Number	Overhead	Underground
ype or		ÞI
H	Series, Series, Series, Series,	, , , , , , , , , , , , , , , , , , ,
Ring	S7486 S7262 S7021 S9550 S9700	S8086-XL, S8084-XL, S7040-XL, S9551-XL, S9701-XL,
Manufacturer	nk	
Manuf	Milbank	

gb - Meter Sockets

Available with UL label

*UL label

gb - Meter Sockets

Rating, Amps.	100 150 200 150 per sta. 200 per sta. 200 per sta. or Delta con 3¢ 4w Y or Delta 600 V	100 150 30 34 4w Y 0r Delta 200 34 4w Y 0r Delta	150 per sta.
No. Jaws	44444 N N N N N N L	4. 4. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7.	4, R
Ringless	501 414* 414* 452 Series 492 Series 492 Series RLK Series*	414* 414* 414 "RLPK" Series	BRL 1915 own by second figure
Type or Catalog Number	Overhead *	Underground	BRL 1915 #Available with UL label * UL label ** Transformer rating in first figure; maximum loading shown by second figure
Type	314* 314* 382 Series	314*	UL label ating in first figur
Manufacturer	Superior	Superior	#Available with UL label * UL label ** Transformer rating in

gb - Meter sockets

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	<u>Conditions</u>
Durham M-400 ampere 4 or 5 jaws for use with Class 10 meters	1086 03/18/76	1. To obtain experience.
Landis & Gyr Meter mounting device 400 ampere, Type K-4# for use with Type MS-K, 1 Duncan meters	947 07/09/70 1136 04/06/78	 To obtain experience. To be used only where Class 400 meters are permitted by local regulatory bodies.
Socket type HQ-4S 4 jaws rated for Class 300 service	1136 04/06/78	 To obtain experience. To be used only where Class 300 meters are permitted by local regulatory bodies.
Milbank Type S1079-F, 4 jaws rated for Class 320 service	1103 12/02/76	1. To obtain experience.

#Available with UL label.

gj - Crossarm Assemblies and Arm Spacers

Distribution

Wood crossarm assembly complete with braces and attaching hardware, fittings and bolts

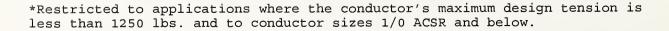
Crossarm Assembly

Manufacturer	Crossarm Size (inches)	Catalog No.
Brooks	3-1/2 x 4-1/2 x 8'-0" 3-3/4 x 5-3/4 x 8'-0" 3-3/4 x 7-3/4 x 8'-0" 3-3/4 x 7-3/4 x 10'-0"	3103-A8 3103-C8 3203-A8 3203-A10
Cascadian	3-1/2 x 4-1/2 x 8'-0" 3-3/4 x 5-3/4 x 8'-0" 3-3/4 x 7-3/4 x 8'-0"	C500B C500F C500M
Hughes Brothers	3-1/2 x 4-1/2 x 8'-0" 3-3/4 x 5-3/4 x 8'-0" 3-3/4 x 7-3/4 x 8'-0" 3-3/4 x 7-3/4 x 10'-0"	2890A 2890B 2892-A 2892-B

Twin Arm Spacer*

To be used with standard hardware, 8' x 3-5/8" x 4-5/8" crossarm, and 28" wood braces

Flagg	PX240
Line Hardware	CAS-455



gj - Crossarm Assemblies

Braceless

	Meeting No.	
<u>Manufacturer</u>	<u>and Date</u>	Conditions
Aluma-Form		
HD-DEA-86-EB-REA	B60 01/29/90	To obtain experience.
HD-DEA-108-EB-REA	1446 05/14/92	To obtain experience.
HD-2-DEA-108-EB-REA	1446 05/14/92	To obtain experience.
Hughes Brothers		
3377-A7.5	1469 06/17/93	To obtain experience.
3377-A8.5	1469 06/17/93	To obtain experience.
3377-A9.5	1469 06/17/93	To obtain experience.

gw - Crossarm Assembly for H-Frame Construction

Applicable Specification: REA Specification T-7, Revision dated

November 1962

Applicable Drawing : TH-11B Series (161 kV maximum)

No braces (TH-11B)

Two vee braces on outside (TH-11BVO)
Two vee braces on inside (TH-11BVI)

Four vee braces (TH-11BV4)

3-5/8" x 9-3/8" x 33' wood crossarm assembly complete with attaching hardware, fittings, bolts and 3-3/8" x 5-3/8" braces.

Catalog Nos. or Drawing Nos.

	<u>TH-11B</u>	<u>TH-11BVO</u>	<u>TH-11BVI</u>	<u>TH-11BV4</u>
(Assemblies)	<u>Items</u> gw	<u>Items</u> gw and vo	<u>Items</u> gw and vi	<u>Items</u> gw and vv
Brooks (1,2)	6411	6411-1	6411-2	6411-3
Cascadian (1,2)	CCC11B72	CCC11B72-VO	CCC11B72-VI	CCC11B72-V4
Hughes Bros.(1,2)	C3316-B	C3316-B	C3316-B	C3316-B

^{1 -} Fixed spacer fitting sizes as required

^{2 -} Adjustable spacers are available

gw - Crossarm Assembly for H-Frame construction (Double Arm) 230 kV (Small Angle)

Applicable Specification: REA Specification T-8 Drawing : TH-231B

Assembly complete with attaching hardware, fittings, bolts and braces.

	Crossarm 3-5/8" x 9-3/8"	
<u>Manufacturer</u>		<u>Catalog Number</u>
Brooks (1, 2)		64231
Cascadian (1, 2)		CCC231B82
Hughes Brothers (1, 2)		C-3338-B
	Crossarm 5-1/8" x 7-1/2"	
Brooks (1, 2)		64231L
Cascadian (1, 2)		CCC231BT
Hughes Brothers (1, 2)		C-3338-BL

- 1 Fixed spacer fitting sizes as required.
- 2 Adjustable spacers are available.

gx - Single Pole Steel Structures with Arms

Applicable Specification: REA Specification for Single Pole Steel Structures Complete with Arms, T-9

Manufacturer

FL Meyer Industries

Muskogee Iron Works

Power Enterprises, Inc.

Union Metal

Valmont Industries, Inc.

Applicable Specification: REA Specification T-7, Revision dated

November 29, 1962

Applicable Drawing:

TH-10 Series

No braces (TH-10)

Two vee braces on outside (TH-10V0)
Two vee braces on inside (TH-10VI)

Four vee braces (TH-10V4)

3-5/8" x 9-3/8" x 32' wood crossarm assembly complete with attaching hardware, fittings, bolts and 3-3/8" x 5-3/8" braces.

Catalog Nos. or Drawing Nos.

	<u>TH-10</u>	<u>TH-10V0</u>	<u>TH-10VI</u>	TH-10V4
	<u>Items</u>	<u>Items</u>	<u>Items</u>	<u>Items</u>
(Assemblies)	ал	gy and vo	gy and vi	gy and vv
Brooks (1,2)	6410	6410-1	6410-2	6410-3
Cascadian (1,2)	CCC1071	CCC1071-VO	CCC1071-VI	CCC1071-V4
Hughes Bros. (1,2)	C-3316-A	C3316-A	C-3316-A	C-3316-A
Niedermeyer- Martin (1)	N-6710	N-6711	N-6712	N-6713

- 1 Fixed spacer fitting sizes as required
- 2 Adjustable spacers are available

gy - Crossarm Assembly for H-Frame Construction (Double Arm) 230 kV (Tangent)

Applicable Specification: REA Specification T-8

Applicable Drawing: TH-230

Assembly complete with attaching hardware, fittings, bolts and braces.

Crossarm 3-5/8" x 9-3/8"

<u>Manufacturer</u>	Catalog No.
Brooks (1, 2)	64230
Cascadian (1, 2)	CCC23081
Hughes Brothers (1, 2)	C-3338-A
Niedermeyer-Martin (1)	N-6720

Crossarm 5-1/8" x 7-1/2"

Brooks (1, 2)	64230L
Cascadian (1, 2)	CCC230T
Hughes Brothers (1, 2)	C-3338-AL

- 1 Fixed spacer fitting sizes as required.
- 2 Adjustable spacers are available.

gz - Crossarm Assembly for Wishbone Construction "Z" Type (Single Arm)

Applicable Specification: REA Specification T-5

Applicable Drawings: REA Drawing TSZ-1

 $3-5/8' \times 5-5/8"$ wood crossarm assembly complete with brace and attaching hardware, fittings, and bolts

The following manufacturers have shown compliance with the applicable specifications for this assembly:

Manufacturer

Catalog Nos. or Drawing Nos.

Brooks

64Z1

Hughes Brothers

C-3162-A and C-3162.10

Applicable Specification: REA Specification T-5

Applicable Drawings: REA Drawings TSZ-2,

3-5/8" x 5-5/8" wood crossarm assembly complete with brace and attaching hardware, fittings and bolts

The following manufacturers have shown compliance with the applicable specifications for this assembly:

Manufacturer

Catalog Nos. or Drawing Nos.

Brooks (2)

64Z2

Hughes Brothers

C-3162-B and C-3162.10

(2) Adjustable spacers are available.

sb - Switch, disconnect (single-pole, hook operated station class)

NEMA standard switches for station or line structure use where single-pole switching is permissible

Manufacturer	<u>Type</u>	Voltage Ratings	System Voltages Line to Line
ABB	HPL	15 thru 69 kV	12.5 thru 69 kV
Bridges	EH	15 thru 69 kV	12.5 thru 69 kV
	EHL (L)	15 thru 34.5 kV	12.5 thru 34.5 kV
Chance	M3 (PL)	15 thru 27 kV	12.5 thru 24.9 kV
Cleaveland/Price	LCO-C	15 thru 69 kV	12.5 thru 69 kV
Cooper Power Systems (McGraw-Edison)	D2 (PL)	15 and 23 kV	12.5 thru 24.9 kV
G & W Electric	B-2M	15 thru 69 kV	12.5 thru 69 kV
	EV(PL)	15 thru 34.5 kV	12.5 thru 34.5 kV
Hi-Voltage	HU	15 thru 34.5 kV	12.5 thru 34.5 kV
(Joslyn)	HI	15 thru 34.5 kV	12.5 thru 34.5 kV
Johnson	нрт	15 thru 69 kV	12.5 thru 69 kV
Kearney	M-72(PL)	15 thru 69 kV	12.5 thru 69 kV
	H-72	15 thru 34.5 kV	12.5 thru 34.5 kV
MEMCO	STV	15 thru 69 kV	12.5 thru 69 kV
	STU	15 thru 69 kV	12.5 thru 69 kV
Morgan	DHS (PL)	15 thru 69 kV	12.5 thru 69 kV
Royal	BT	15 thru 69 kV	12.5 thru 69 kV
Switchgear	BLT(PL)	15 and 23 kV	12.5 thru 24.9 kV
S & C*	LBD(PL)	15 thru 34.5 kV	12.5 thru 34.5 kV
	Alduti (L)	15 and 25 kV	12.5 thru 24.9 kV
Seeco	BT	34.5 thru 69 kV	34.5 thru 69 kV
Siemens-Allis	HA	15 thru 69 kV	12.5 thru 69 kV
	HS (PL)	15 and 25 kV	12.5 thru 24.9 kV

- (L) Means solid material load interrupters are available and accepted.
- (LV) Means vacuum interrupters are available and accepted.
- (PL) Means hooks for portable load interrupters are available for voltages 34.5 kV and below. Consult switch manufacturer concerning loop switching applications at higher voltages.

^{*}Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

sb - Switch, disconnect (single-pole, hook-operated station class)

NEMA standard switches for station or line structure use where single-pole switching is permissible

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Ratings</u>	System Voltages <u>Line-to-Line</u>
Southern States	PBO *PBN	15 thru 69 kV 15 thru 23 kV	12.5 thru 69 kV 12.5, 13.2, 24.9 kV
USCO	HH (PL)	15 thru 69 kV	12.5 thru 69 kV

- (L) Means solid material load interrupters are available and accepted.
- (LV) Means vacuum interrupters are available and accepted.
- * With steel base only.
- (PL) Means hooks for portable load interrupters are available for voltages 34.5 kV and below. Consult switch manufacturer concerning loop switching applications at higher voltages.

For distribution line use where power class insulation is not required and single-phase switching is permissible.

(Not suitable for substation use)

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Rating</u>	System Voltage <u>Line-to-Line</u>
Chance	M3 (PL)	15 and 27 kV	12.5 thru 24.9 kV
Cooper Power Systems (McGraw-Edison)	D2 (PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
G & W Electric Company	EV(PL)	15 kV	12.5 kV
Kearney	D-73 (PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Morgan	DHS (PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
Royal Switchgear	BLT-F(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
S & C**	LBD (PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Siemens-Allis	HD(PL)	15 and 25 kV	12.5 thru 24.9 kV

NOTE: Switches on this page must be furnished with four bolts for double crossarm mounting.

- (L) Means solid material load interrupters are available and accepted.
- (PL) Means hooks for portable load interrupters are available.
- (LV) Means vacuum interrupters are available and accepted.
- *Steel bases only.

^{**}Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34:5 kV on request.

sb - Switch, hookstick (line tension Switches)

for use on 12.5/7.2 kV systems only

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
Bridges 127	1479 12/16/93	To obtain experience.
Chance LTD06150R (L)	1474 10/07/93	To obtain experience.
Royal Switchgear IL6B-H (available with silicone polymer insulators as catalog number IL6NP)	1332 12/04/86 1365 06/23/88 1479 12/16/93	To obtain experience.

NOTE: All switches listed on this page have hooks for portable load interrupters.



⁽L) Means solid material load interrupters are available and accepted.

sc - Regulators, Voltage 12.5/7.2 kV 13.2/7.62 kV

Applicable Specification: "REA Specification for Substation Regulators," S-2.

Type	<u>Size</u>		Description
		<u>ABB</u>	
UTS, UTT	167-1000 kVA		(S) Three phase step type

Cooper Power Systems (McGraw-Edison)

VR-32	19.1 - 833 kVA	(SL)Single phase - step type
AB	50 amp.	(L) Single-phase - step type
		(Auto-Booster)

General Electric

VR-1	38.1 - 509 kVA	(SL) Single-phase - step type
MLT	500 - 1000 kVA	(S) Three-phase - step type
VML-32	500 - 833 kVA	(S) Single-phase - Vacuum step type
VMLT-32	1200 - 2800 kVA	(S) Three-phase - vacuum step type

Siemens-Allis

JFR 38.1 - 667 kVA (SL) Single-phase - step type

- (L) Indicates line use
- (S) Indicates substation use

sc - Regulators, Voltage 24.9/14.4 kV

<u>Type</u>	Size	<u>Description</u>
		Cooper Power Systems (McGraw-Edison)
VR-32 AB	72 - 833 kVA 50 amp.	(SL) Single phase - step type (L) Single phase - step type (Auto-Booster)
		General Electric
VML-32	72 - 576 kVA 500 - 833 kVA 1200 - 4666 kVA	(SL) Single phase - step type (S) Single phase - vacuum step type (S) Three phase - vacuum step type
		<u>Siemens-Allis</u>
JFR	72 - 833	(SL) Single phase - step type

- (L) Indicates line use (S) Indicates substation use



Manufacturer	Meeting No. <u>and Date</u>	Conditions
General Electric Three-phase, step-type substation regulator Type TMLT-32 (13.2/7.62 kV)	723 09/28/61	To obtain experience.
<u>Siemens-Allis</u> Three-phase, step-type substation regulator Type SFR (13.2/7.62 kV)	657 11/24/58	To obtain experience.

sd - Current Transformers Outdoor Type

<u>Manufacturer</u>	<u>.6 kV</u>	<u>15 kV</u>	<u>25 kV</u>	<u>34.5 kV</u>	<u>69 kV</u>
ABB	CSF/CMS CMF CLC/CLE	KOR-11 KON-11 KOT-11	ICT-150 KOR-15 KOT-15	ICT-200 KOR-20	ICT-350
Andover	DCBW DCCW DCAB				
Associated Engineering	GT HA WEO	BB-15 LG-15	BB-25 LG-25 COF-150	LG-34.5 COF-200	COF-350
G.E.C. Durham Industr (Astra)	ies AA&TA AB AD&AC				
Electromagnetic Industries (Square	D)	CO3-110	CO3-150	CO3-200	1K-350
General Electric	JCR-0 JCW-0 JAK-0 JAD-0	JKW-5 JCK-5	JKW-6 JKW-150 KG-150	JKW-7 JKW-200 KG-200	JKW-350 KG-350
Schlumberger	R6S R6SA R6M R6L				

NOTE: The transformer types listed above are accepted in all standard ratios. Insulation class, voltages, ratios and other necessary information should be specified when ordering.

sd - Current Transformers Outdoor Types

Manufacturer	Meeting Noand Date	Conditions
Electromagnetic Ind. (Square D)		
Type UMCT, 0.6 kV Type UCT, 0.6 kV Type IK 4-350-69, 69 kV (cycloaliphatic resin bushings)	971 07/15/71 1325 08/14/86	To obtain experience.

se - Voltage Transformers

	Outdoor Types				
Manufacturer	<u>.6 kV</u>	<u>15 kV</u>	<u>25 kV</u>	34.5 kV	<u>69 kV</u>
ABB	PPM	VOG-11 VOY-11 VOZ-11	LPT-150 VOG-15 VOZ-15	LPT-200 VOG-20 VOZ-20	LPT-350
Andover	DVE-6 DVF-6				
Associated Engineering	CL TL	PTT-150 SPOF-100 PTT-110	PTT-150 SPOF-150	POF-200	POF-350
Electromagnetic Industries (Square	D)	PO5-110	PO5-150	PO5-200	U3-350-69
General Electric	JVA-0 JVP-0	JVW-5 JVW-110	JVW-6 JVT-150	JVW-7 JVT-200	ET-350 JVT-350
Schlumberger	T5R T6R T7R				

NOTE: The transformer types listed above are acceptable in all standard ratios. Insulation class, voltages, ratios and other necessary information should be specified when ordering.

se - Voltage Transformers

Outdoor Types

Manufacturer	Meeting No. <u>and Date</u>	Conditions
G.E.C. Durham Industries (Astra) Type DB, 0.6 kV Type DA, 0.6 kV Type DF, 0.6 kV	1087 04/01/76 1261 04/01/76 1478 11/18/93	To obtain experience.
Electromagnetic Industries (Square D Type U-450, 0.6 kV Type U-4-350-69, 69 kV (cycloaliphatic resin bushings)) 1080 12/23/75 1325 08/14/86	To obtain experience.

sj - Switches, oil circuit recloser by-pass

<u>Manufacturer</u>	15 kV For use on 12.5/7.2 kVsystems	27 kV For use on 24.9/14.4 kV systems	27 kV* For use on 34.5/19.9 kV systems	Current Rating <u>Amperes</u>
Chance	M3-R	M3 - R	M3 - R	600
Cooper Power Systems (McGraw-Edison)	s FW77D7	FW77D9	FW77D9	600
Kearney	D73RB	D73RB		600

^{*}Not For Use In Substations



sk - Switch, regulator by-pass - disconnect For outdoor use

<u>Manufacturer</u>	15 kV for use on 12.5/7.2 kV Systems	27 kV for use on 24.9/14.4 kV Systems	Current Rating <u>Amperes</u>
Kearney	HB-65	HB-65	600
S & C Electric*	XL	XL	600
Siemens-Allis	HR	HR	600
Southern States	BR	BR	400,600

NOTE: All switches should be furnished with NEMA standard insulators and with 110 kV BIL rating (15 kV systems) or 150 BIL ratings (25 kV systems) for station use.

^{*}Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

sk - Switch, regulator by-pass - disconnect For outdoor use

Manufacturer	Meeting No. _and_Date	Conditions
Cooper Power Systems (McGraw-Edison) Type B, 15 kV, 400 amperes 110 kV BIL for station use	1035 02/21/74	To obtain experience.

sl - Switch, Combination Power Fuse and Disconnect

(Used with an additional disconnect switch to by-pass oil circuit reclosers at substations.)

Manufacturer systems	15 kV for use on 12.5/7.2 kV systems	27 kV for use on 24.9/14.4 kV
Hi Voltage	RFH	
Kearney	MHX	MHX
S & C Electric*	SMD/LBD XS/LBD	SMD/LBD
Southern States	SF	

NOTE: All switches and cutouts should be furnished with NEMA standard insulators.

^{*}Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

sr - Steel for Substation Grounding, Copper-Clad or Galvanized

(See av-2 for copper grounding conductor)

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
Bethlehem Steel 7/16" and 1/2" steel strand, BB grade, Class C galvanized	1015 04/26/73	 To obtain experience. When used in soil with resistivity of 25 ohmmeters (2500 ohms per centimeter cube) or less, cathodic protection must be incorporated into the grounding design.
Copperweld Steel 40% conductivity DSA Copperweld Strand in sizes: 1/2" (7 No. 6 AWG) 9/16" (7 No. 5 AWG) 5/8" (7 No. 4 AWG) 13/16" (19 No. 6 AWG) 7/8" (19 No. 5 AWG)	954 10/29/70	 To obtain experience. When used in soil with resistivity of 25 ohmmeters (2500 ohms per centimeter cube) or less cathodic protection must be incorporated into the grounding design.
<pre>Indiana Steel & Wire Steel Strand, BB Grade, Class C galvanized 5/8" (19 wire) 1/2" (7 wire) 9/16" (7 wire) 7/16" (7 wire)</pre>	1004 11/16/72 1133 02/16/78	 To obtain experience. When used in soil with resistivity of 25 ohmmeters (2500 ohms per centimeter cube) or less cathodic protection must be incorporated into the grounding design.

vx - Cross Brace assembly, 3-3/8" x 5-3/8" with hardware and fittings (Dwg. TM-110, REA Specification T-7)

<u>Manufacturer</u>	Catalog No.
Brooks Item 1-vx Item 2-vx	6685-1 6685-2
<u>Cascadian</u> Item 1-vx Item 2-vx	CCC-67-1 CCC-67-2
Hughes Brothers Item 1-vx Item 2-vx	1042-1 1042-2
Niedermeyer-Martin Item 1-vx Item 2-vx	N-6714-1 N-6714-2

Cross Brace Assembly, 3-5/8" x 7-1/2" Min. with hardware and fittings

Applicable Specification: T-8
Drawing: TM-110

<u>Manufacturer</u>	Catalog No.
Brooks	6695
Cascadian	CCC69
Hughes Brothers	2061A
Niedermeyer-Martin	N6721



PART II <u>Underground Distribution Equipment</u>



U ae - Surge Arresters, Distribution for Underground System Pole Risers (Lightning Arresters)

<u>Manufacturer</u>	Arrester Class	Arrester <u>Type</u>	Ratings - kV
ABB	Distribution, normal duty Distribution, normal duty	GLV LVBB	9, 10 18
General Electric	Distribution, heavy duty	Alugard	9, 10, 18
Joslyn	Distribution, normal duty Distribution, heavy duty	Q J	9/10, 18 9/10, 18
Kearney	Distribution, heavy duty	Unigap	9, 10, 18

NOTE: The arresters listed on this page may be used singly or in parallel, but must be applied in accordance with paragraph VI.A., in REA Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

^{*}Has intermediate class arrester characteristics but does not have intermediate class venting capability.

(25 kV interface)

U ae - Arresters, Surge

(Shielded for Underground System Pad-Mounted Equipment)

	Meeting No.	
<u>Manufacturer</u>	and Date	<u>Conditions</u>
ELE	BOW ARRESTERS	
(2-2)		
<u>Cooper Power Systems</u> (RTE) Metal Oxide Elbow Arrester	1105	To obtain americas
M.O.V.E9/10 kV (15 kV interface)	1185	To obtain experience.
M.O.V.E18 kV (25 kV interface)	1386	
M.O.V.H. TO KV (25 KV INCCIDENCE)	06/29/89	
	1387	
	07/20/89	
	1483	
	03/24/94	
VariGAP, 9, 10 kV MOV Elbow	1473	To obtain experience.
(15 kV class)	09/23/93	
VariGAP, 18 kV MOV Elbow		
(25 kV class)		
Elastimold (ESNA)	1256	m 1.
Metal Oxide Elbow Arrester	1356	To obtain experience.
10 kV	01/28/88	
167ESA - 10 (15 kV interface) 18 kV		
273ESA - 18 (25 kV interface)		
Z/SESA - IO (ZS AV INCCITACE)		
<u>Joslyn</u>		
Metal Oxide, Elbow Arrester	1297	To obtain experience.
Type ZE, 10, 18 kV	04/11/85	
PARKING	S STAND ARRESTERS	
Cooper Power Systems (RTE)		
9/10 kV MOV Parking Stand	1470	To obtain experience.
(15 kV interface)	07/08/93	
18 kV MOV Parking Stand	1483	
(25 kV interface)	03/24/94	
VariGAP, 9, 10 kV MOV Parking	1471	To obtain experience.
Stand (15 kV interface)	07/22/93	-
VariGAP, 18 kV MOV Parking		
Stand (25 kV interface)		
Elastimold (ESNA)	1465	To obtain amorions
10 kV MOV Parking Stand	1465 04/15/93	To obtain experience.
Arrester, 167PSA-10 (15 kV interface)	04/ I3/ 33	
18 kV MOV Parking Stand		
Arrester, 273PSA-18		
(25 kV interface)		

U ae - Arresters, Surge

(Shielded for Underground System Pad-Mounted Equipment)

Manufacturer

Meeting No. and Date

Conditions

BUSHING ARRESTERS

Elastimold (ESNA)

10 kV MOV Bushing 167BSA-10 (15 kV interface) 18 kV MOV Bushing 273BSA-18 (25 kV interface) 1473 09/23/93 To obtain experience.

U ae - Arresters, Surge (For Underground System Pole Risers)

	Meeting No.	- n
<u>Manufacturer</u>	and Date	<u>Conditions</u>
ABB		
Metal Oxide, HMX	1320	To obtain experience.
Heavy Duty: 9, 10, 18 kV	05/08/86	
Metal Oxide, RMX	1320	To obtain experience.
Intermediate Class*	05/08/86	
9, 10, 18 kV		
Matal Orida VDD	1442	To obtain amaniana
Metal Oxide, XPR Distribution Type;	1443 03/19/92	To obtain experience.
9, 10, 18, 27 kV;	03/13/32	
Heavy Duty; (Polymer)		
Cooper (McGraw-Edison)		
AZRP (Polymer)	1396	To obtain experience.
Distribution Type	01/11/90	
9, 10, 18, 27 kV	1423	
Heavy Duty	04/25/91	
	1444 04/09/92	
	04/09/92	
Internally gapped metal oxide	1423	To obtain experience.
Heavy duty (Porcelain)	04/25/91	-
9, 10, 18, 27 kV, AZR500 VariGAP	1483	
	03/23/94	
Internally gapped metal oxide	1423	To obtain experience.
Heavy duty (Polymer)	04/25/91	ro obtain experience.
9, 10, 18, 27 kV, AZRP500 VariGAP	1483	
, = ,	03/23/94	
Metal Oxide, AZR VariSTAR	1486	To obtain experience.
Heavy Duty (Porcelain)	05/19/94	
9, 10, 18, 27 kV		
General Electric		
Metal Oxide, Tranquell**	1292	To obtain experience.
U.D. II 9, 10, 18 kV	01/10/85	
Metal Oxide, Tranquell	1197	To obtain experience.
Intermediate Class	10/09/80	
9, 10, 18, 27 kV		

^{*}Has intermediate class arrester characteristics but does not have intermediate class venting capability.

^{**}A non fragmenting U.D. II Arrester is available for 9 & 10 kV designs at higher cost when specified.

U ae - Arresters, Surge

(For Underground System Pole Risers)

<u>Manufacturer</u>	Meeting No. <u>and Date</u>	<u>Conditions</u>
<u>Joslyn</u> Metal Oxide, Type ZJ U.D. 9, 10, 18 kV	1266 09/22/83	To obtain experience.
Metal Oxide, Type ZR Intermediate Class* 9, 10, 18 kV	1266 09/22/83	To obtain experience.
Metal Oxide, Type ZJP Heavy Duty; (Polymer) 9, 10, 18, 27 kV	1431 09/5/91	To obtain experience.
<u>Kearney</u> Metal Oxide Univar Type SGR 9, 10, 18, 27 kV	1400 03/15/90	To obtain experience.
<u>Ohio Brass</u> Metal oxide type DynaVar 9, 10, 18kV	1236 06/10/82 1378	To obtain experience.
Polymer PVR	02/09/89 1396 01/11/90	
Metal Oxide, DynaVar Intermediate Class 9, 10, 18 kV	1236 06/10/82	To obtain experience.

^{*}Has intermediate class arrester characteristics but does not have intermediate class venting capability.

^{**}A non fragmenting U.D. II Arrester is available for 9 & 10 kV designs at higher cost when specified.

U an - Transformers, distribution pad-mounted, dead-front

(For underground application)

Applicable Specifications: "REA Specifications for Pad-Mounted Transformers," U-5.

Manufacturer	Single Phase	Three-Phase
ABB (2, 4)	"Mini-Pak U-5" 25-167 kVA	Type MTR 75-1500 kVA "Plazapad-U5" 2000-2500 kVA
Central Moloney (2, 4)	"REA-LP" 25-167 kVA	
Cooper (2, 4)	"REA Shrubline 15-167 kVA	"REA Terra-Tran" 45-2500 kVA
ERMCO (2, 4)	"Low-Profile" 10-167 kVA	
General Electric (2, 4)	"Mini-Pad III - REA" 10-167 kVA	"Compad IV - REA" 75-2500 kVA
Howard (2, 4)	"Hi Pad REA" 10-167 kVA	"Hi Pad 3 REA" 45-2500 kVA
Kuhlman (2, 4)	"Lo-Pak ELR" 25-167 kVA	"K-PAK-3 REA" 750-2500 KVA
H. K. Porter (2, 4) (Delta-Star)	"Low Profile U 5-R" 25-167 kVA	"Porter U5-R3" 225-2500 kVA
Pauwels Tranformers (2,4)		"Turf-Hugger-R" 45-2500 kVA
United (KAEC) (1) (6)	"Pad-Mount" 15-100 kVA "Pad-Mount" 25 & 50 kVA	
VanTran (3, 4)	"Mini-Pad U5" 5-167 kVA	"VanTran III-U5" 30-2500 kVA

- (1) 7.2/12.5 and 7.6/13.2 kV
- (2) 7.2/12.5, 7.6/13.2 and 14.4/24.9 kV
- (3) 7.2/12.5 and 7.6/13.2 kV (conditional listing for 14.4/24.9 kV)
- (4) Dual Voltage Same as for 14.4/24.9 kV, single phase
- (5) Three-phase listing applies to 7.2/12.5 and 7.6/13.2 kV only
- (6) 14.4/24.9 kV

NOTE: The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available form the manufacturer.



U an - Transformers, Distribution Pad-Mounted, Dead-Front

(For unit residential underground application, 7.2/12.5 and 7.6/13.2 kV, 5-25 kVA single phase only)

Manufacturer	<u>Type</u>
ABB	"Micro-Pak U-5" 10-25 kVA
Central Moloney	"REA-Mini-LP" 10-25 kVA
Cooper	"Ranch Runner" 10-25 kVA
ERMCO	"REA-MicroTrim" 10-25 kVA
General Electric	"Micro-Mini-Pad" 10-25 kVA
Howard	"Spacesaver Pad" 10-25 kVA

NOTE: The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

U an - Transformers, Distribution Pad-Mounted, Dead-Front

(For underground application)

<u>Manufacturer</u>	Meeting Noand Date	Conditions
ABB 7.2/12.5, 7.62/13.2 14.4/24.9 and Dual Voltage		
Single-phase type "Mini-Pak U-5" Single-phase type "Micro-Pak U-5" three phase type MTR, all with internal UMX Under-Oil Arrester or with internal "Tranquell" Under- Oil Arrester	1395 12/21/89 1438 12/31/91	To obtain experience.
Cooper Power Systems (RTE) 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and dual voltage, single phase, self protected, padmount distribution transformer with Magnex Interrupter	1376 01/12/89 1438 12/31/91	To obtain experience.
Above or fully accepted, with Type AZU, MOV, heavy-duty under-oil arrester.	1444 04/09/92	To obtain experience.
ERMCO Single phase transformers with internal "Tranquell" under oil arrester "Low-Profile 10-167 kVA, 7.2/12.5, 7.62/13.2 14.4/24.9 kV and Dual Voltage	1394 11/30/89 1438 12/31/91	To obtain experience.

U an - Transformers, distribution Pad-Mounted, Dead-Front (For underground application)

	Meeting No.	
Manufacturer	and Date	Conditions
Guerral Plantain	1216	ma alatada assassiasa
General Electric Single phase transformers	1316 03/06/86	To obtain experience.
with internal Tranquell	03/00/00	
Under-Oil Arrester		
"Mini-Pad III - REA" (10-167 kVA)		
7.2/12.5 and 7.6/13.2, 14.4/24.9	kV	
and Dual Voltage	1316	
"Micro-Mini-Pad" (10-25 kVA)	03/06/86	To obtain experience.
7.2/12.5 and 7.6/13.2 kV	1447	
	05/28/92	
Three phase transformers with	1316	To obtain experience.
internal Tranquell Under-Oil Arrester	03/06/86	
"Compad IV-REA"	1363	
7.2/12.5, 7.6/13.2, 14.4/24.9 kV	05/26/88	
and Dual Voltage	1447	
Cinal anhara Maini Dad DEAM	05/28/92 1320	Ma abtain assassiones
Single-phase "Mini Pad-REA" 10-100 kVA transformers with	05/08/86	To obtain experience.
amorphous metal cores	1418	
7.2/12.5, 7.6/13.2, 14.4/24.9 kV	01/31/91	
and Dual Voltage	1447	
and buar vortage	05/28/92	
Three-phase transformers 75-750	1363	To obtain experience.
kVA with amorphous metal core	05/26/88	io ozdam emperiemee.
"Compad IV-REA" 7.2/12.5, 7.6/13.2,	1447	
14.4/24.9 kV and Dual Voltage	05/28/92	
·		
Howard Industries	1448	To obtain experience.
Transformers listed below	06/11/92	
with "Tranquell" or "AZU"		
under-oil arresters:		
7.2/12.5, 7.62/13.2,		
14.4/24.9 kV & Dual Voltage		
Single-phase		
"Hi-Pad REA" 10-167 kVA		
"Spacesaver Pad" 10-25 kVA		
Three-phase "Hi-Pad 3 REA" 45-2500 kVA		
III I I I I I I I I I I I I I I I I I		
Square D		
Three-phase	1298	To obtain experience.
Class 7230 REA 75-2500 kVA	04/25/85	-
7.2/12.5 & 7.62/13.2 kV	1443	
	03/19/92	

NOTE: The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

U ax - Cutout and Arrester, Combination for Underground System Pole Risers

Nominal System	For	12.5Y/	For 13.2Y/ For	24.9Y/
<u>Voltage</u>		7.2 kV	7.6 kV	14.4 kV
Cutout Maximum				-
Voltage Rating	7.8 kV	15 kV	15 kV	27 kV
	1ø	3ø	1ø and 3ø	1ø and 3ø
Application	Risers	Risers	Risers	Risers
Cutout Current	100	100	100	100
Rating	amps	amps	amps	amps

Manufacturer	:	Catalog Numb	ers	
ABB	7.8LBU-II/ 10 LV	15LBU-II/ 10 LV	15LBU-II/ 10 LV	24.9LBU-II/ 18 LV
Chance	C7 Series	C7 Series	C7 Series	C7 Series
Cooper (McGraw- Edison)	AFS300B Series	AFS300C Series	AFS300C Series	AFS300D Series
General Electric	9F80	9F80	9F80	9F80
Southern States	CA Series	CA Series	CA Series	CA Series

NOTE: The units listed on this page may be used with single arresters or arresters in parallel, but must be applied in accordance with paragraph VI.A. in REA Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

U ax - Cutout and Arrester Combination for Underground System Pole Risers

Nominal System Voltage	For 12.5Y/7.2 kV	For 13.2Y/7.6 kV	For 24.9Y/14.4 kV	Conditions
Cutout Maximum Voltage Rating	7.8 kV 15 kV	15 kV	27 kV	
Application	1¢ 3¢ Risers Risers	1¢ and 3¢ Risers	1¢ and 3¢ Risers	ì
Cutout Current Rating	100 100 amps amps	100 amps	100 amps	

		To obtain experience
		J9267-ZJ2
Metal Oxide Type Arresters	Catalog Numbers	J9237-ZJ2/R
Metal Oxide		J9237-ZJ2 J9237-ZJ2/R
	<u>Manufacturer</u>	Joslyn (Distribution) Meeting No. 1266 (9/22/83)

arresters listed on pages ae-1 and ae-1 may be used for underground systems when applied in	with REA Bulletin 61-3, "Underground Rural Distribution."
ther	ccord
Note 1: C	

Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters. Note 2:

U be - Reclosers, pad-mounted

Manufacturer	Meeting Noand Date	<u>Conditions</u>
Cooper Power Systems (McGraw-Edison)	1373	To obtain experience.
Single phase, vacuum	11/17/88	is abutin chiperionec.
interrupter,		
Type PV4H		
Maximum voltage 14.4 kV for		
12.5 and 13.2/7.62 kV		

NOTES:

- 1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
- Reclosers are not acceptable with load current, bushing CT battery chargers.

U cg - Switch, air, three-pole, group-operated for pole-mounted cable risers (Factory Preassembled)

<u>Manufacturer</u>	Mounting	Vertical Break <u>Type kV</u>	Side Break Type kV
ABB	Vertical	LB3-VR(L)15	
Chance	Vertical Horizontal		D7 (L) 15-27 D7 (L) 15-27
Kearney/KPF	Horizontal	SB_R(L) 15-35	
S & C*	Vertical Horizontal		Alduti(L)15-25 Alduti(L)15-25

(L) Means gas or solid material full-load interrupters are accepted and available.

NOTE: Switches with factory-assembled crossarm type bases must have nonconducting crossarm type bases, nonconducting braces, and insulated interphase and control rods.

*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

U cg - Switch, Air, Three-Pole, Group Operated

	Meeting No.	
<u>Manufacturer</u>	and Date	Conditions
<u>Chance</u>		
Type S (L)	1429	To obtain experience.
side-break, horizontal	08/01/91	_
and vertical mounting, with	, .	
non-conducting crossarm		
type base and insulated		
interphase and control rods,		
15 and 25 kV.		
S & C*		
Omni-Rupter (L), side break	1355	To obtain experience.
horizontal and vertical	01/14/88	
mounting with non-conducting		
crossarm type base and	1371	To obtain experience.
insulated interphase and	10/06/88	_
control rods,		
15 kV and 25 kV		

⁽L) Means full-load interrupter accepted and available.

^{*}Available with porcelain insulators. Available with Cypoxy insulators through $34.5\ kV$ on request.

U fw - Secondary Tap Connector

Manufacturer Type or Catalog No.

Raychem Compression Connectors

CRSM-CT-1-150 CRSM-CT-2-200 CRSM-CT-3-250

Standard Split Bolt

CRSM-CT-2-200

U fz - Transformer Connector Block, Insulated Multiple Cable Connectors

Watertight - For use in all locations

<u>Manufacturer</u>	Connection Type	<u>Catalog Number</u>
Blackburn	Lug	SCU, with lugs and sleeves
Burndy	Lug	Stud Mole with sealing sleeve
Utilco	Set Screw	PTF-SS, Watertight
		Insulated transformer
		Connector block
Non-Watertight - For use	in above grade loca	ations only
Alcoa	Lug	Interchange 1
	_	ABBD Series (Disconnectable)
		Use with A9 insulating boots
Alcon	Set Screw	VBTT Series with double
		sealing sleeve
Blackburn	Set Screw	TSB-J58C (Permanent)
	Set Screw	TSB-D58C (Disconnectable)
Burndy	Set Screw	K-D Series (Disconnectable)
		K-DF Series (Permanent)
Connector Mfg. Co.	Set Screw	Uni-Joint Bar Connectors,
		(Series RLS, NSM-C, NDS-C, NSC
		ZS-C, ZSU-C, RLUS)
		(Permanent)
	Set Screw	Uni-Joint Bar Connectors,
		(Series RLSS, NSSM-C, NSSC,
		ZQC, ZQU-C, RLUSS)
		(Disconnectable)
ESP	Lug	Types SUR and RDSR(Removable)
		(With Types LA and AL-lugs
		and Sleeve kits)
	Set Screw	Type UPSO-I (Permanent)
		Type UPM-I (Disconnectable)
Fargo	Bolted	GUC Series
	Set Screw	GUS-600S Series
Homac	Lug	DF Series
	Lug	FTU 125 Series(Disconnectable)
		with flood seal sleeve kit
	Set Screw	LRT Series
Penn Union	Lug	Type DBAT (Permanent)
	Lug	Type DBAT-LH (Disconnectable)
		Use with Series DBTB, DBTBF
		and DBTH lug and Sleeves kits
Preformed	Set Screw	SC-C series (Permanent)
	Set Screw	SC-Q-C series (Disconnectable)
Reliable	Set Screw	15912-REA (Disconnectable)
Utilco	Set Screw	PTF-IN (Permanent)
	Set Screw	PTF-CJNU (Disconnectable)

Note: Additional insulation may be required with some of the above-listed secondary terminal blocks due to the irregularity of mating surfaces between various secondary studs being supplied by the transformer manufacturers.

U gc - Shield, cable riser

Manufacturer	<u>Dia. (Inches)</u> <u>Galvanized Steel</u>	<u>Length (Feet)</u>		
Chance	2 - 3 - 3-1/2	5 - 9		
*Cooper Power Systems (McGraw-Edison)	2 - 3 - 4	3 - 5 - 10		
*Electrical Materials	2 - 3 - 4 - 5	5		
*Joslyn	2 - 3 - 3-1/2	5 - 8		
Midland-Ross (Kindorf Snapduct)	2 1/2 - 3 1/2 - 5 (14 ga. galv. steel)	2 1/2 - 5 - 10		
Plastic and Fiberglass				
*Carlon	2 - 3 - 4 - 5 - 6	10		
*Custom Plastics	2 - 3 - 4 - 5	5 - 10		
*Electrical Materials (plastic)	2 - 3 - 4 - 5	5 - 10		
*Applied Extrusion Technologies (plastic) (Power Mold, I, II, I		5 - 9 - 10		
*Joslyn (plastic)	2 - 3 - 4 - 5	5 - 10		
*Nordic (fiberglass)	2 - 3 - 5	5 - 10		

(Order by size and length)

#All sizes available with galvanized finish or painted-over galvanizing.

*All sizes available with back plate.

Full Round**

Smith Fiberglass Products (standard wall)

2 - 3 - 4 - 5

30

^{**}Full round riser shield is to be mounted directly to the surface of the pole with no standoffs.

U gk - Terminations, Indoor

(When ordering specify conductor size, type, whether copper or aluminum and insulation diameter.)

<u>Manufacturer</u>	Catalog No.
Chardon Electrical Components	Termi-Matic, Type A or G (15, 25 & 35 kV)
Cooper Power Systems (RTE)	Fasterm Stress Cone (15 & 25 kV)
Elastimold (ESNA)	Style 35-MSC (15, 25 & 35 kV)
<u>Joslyn</u>	JPT series (15 kV)
Plymouth/Bishop	Stress-Wrap (15, 25 & 35 kV)
Raychem	Thermofit HVT (15, 25 & 35 kV)
Sigmaform	Q-Cap Series STK-I (15 & 25 kV)
<u>3M</u>	Quick Term II Series (15, 25 & 35 kV)

U gk - Terminations, outdoor
 (with mounting hardware) *

(When ordering, specify conductor size, type, whether copper or aluminum, insulation diameter, and type of mounting desired.)

Manufacturer Catalog_Number

POLYMER

Chardon Electrical Components Termi-Matic, Type G (15, 25 and 35 kV)

Cooper Power Systems (RTE) Fasterm Series (15 & 25 kV)

Elastimold (ESNA) Style 16-THG (15 and 25 kV)

(for bare concentric neutral cable)

Style 35-MT (35 kV)

(for bare concentric neutral cable)

Style PCT-1 (15 kV)

(for jacketed cable)

Style PCT-2 (25 kV)

(for jacketed cable)

<u>Joslyn</u> JPT Series (15 kV)

Plymouth/Bishop SWO Kit (15, 25 and 35 kV)

Raychem Thermofit HVT (15, 25 and 35 kV)

Sigmaform Q-Cap Series STK (15 & 25 kV)

<u>3M</u> 5900 Series 15 kV (4/0 AWG and larger)

25 kV (#2 AWG thru 750 kcmil)

"Quick-Term II" (15, 25 and 35 kV)

5600 Series (for bare concentric

neutral cable)

5640 and 5650 Series (for jacketed

cable)

PORCELAIN

G & W "Eliminator" 15 kV, E

25 kV, E

35 kV, E

<u>Joslyn</u> "Easy-On II" (15, 25 and 35 kV)

*Mounting Hardware is used to attach termination to mounting bracket (U hd or U hj).

NOTE: Some of the above terminators may require ordering the mounting hardware separately.

U gn - Enclosures, equipment

Applicable Specifications: "REA Specifications for Equipment Enclosures,"

U-4

Manufacturer Catalog No.

<u>Durham</u> AT-42 Series (dead-front)

AT-54 Series (dead-front)

<u>Elliott</u> EPM-PTS (dead-front)

<u>Kearney/Western Power</u> 300 Series

Products

Malton Electric

ME Series (dead-front)
MEV Series (dead-front)

<u>Maysteel</u>

EL100 (dead-front)

- NOTE: 1. The above enclosures are available with various multipoint terminations. The owner should specify termination points to be provided.
 - 2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

U qn - Enclosures, Equipment

<u>Sectionalizing Enclosures</u>

Manufacturer Catalog No.

Cooper Power Systems (RTE) SecTER Series I and II

(Single-Phase and Three-Phase)

<u>Durham</u> AMSP() Series

Kearney/Western Power 310 Series

Products

Malton Electric ME Series

MEH Series

<u>Maysteel</u> CW200 Series

CW300 Series

Nordic ND Series

Power Design Inc. Type CJP series, single-phase and

three-phase, 15 and 25 kV

Rough Rider Industries Series RUF93

NOTE: 1. The above enclosures are available with various multipoint terminations. The owner should specify termination points to be provided.

2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

U go - Fault Indicator (For Construction Unit UM6-4)

Manufacturer

Type

Cooper Power Systems
(McGraw-Edison, RTE)

Linam TPR, LV, MR

Edison Control Corporation

Series EC100 (single phase)
Series EC300 (three phase)
(Available with mounting kit
KT5002)

Fisher Pierce

Series 1514 (current reset, single-phase
Series 1515 (current reset, three-phase)
Series 1541 (time reset, single-phase
Series 1543 (time reset, three-phase
Series 1547 (adaptive trip)

U gp - Connector Blocks and Splices, Secondary

Watertight - For Use In All Locations

watertight - For Use in All Locations			
Manufacturer	Connection Type	<u>Catalog Number</u>	
Alcon	Set Screw	VPB Series	
Blackburn	Lug Set Screw	Series UP (with lugs and sleeves) Series USB (1000 amp bus with sleeves)	
Burndy	Lug	URD Mole	
Connector Mfg. Co.	Compression	Utilug Sure Seal Splice Kits, Series SSK, SSKL	
	Set Screw	Uni-Joint Sure Seal Series SSBC	
	Set Screw	Secondary Connector ULS2-350	
ESP	Lug	Type UC (8 AWG - 500 kcmil) (with LA lug and sleeve)	
	Set Screw	Type UPP	
Fargo	Set Screw	GU-600 Series	
Homac	Connector Blocks: Lug	FS-95 Series with flood seal	
	Lug	sleeve kit (8AWG - 350 kcmil) FS-125 Series with flood seal sleeve kit (350 - 500 kcmil)	
	Set Screw	SHC Series	
	Set Screw	RAB Series	
	Splices:		
	Compression Set Screw	RRK Series (#2AWG - 350 kcmil) UH11L	
	Set Screw	USK Series	
	Set Screw	MTB Series	
Kearney	Compression	HCR	
	Compression	HAR	
Penn Union	Lug	DBA Series with DBTB, DBTBF and DBTH Series lug and sleeve kits	
Reliable	Set Screw	15903-15908, 15910 with sleeve kit (4 AWG - 350 kcmil) 15911 with sleeve kit (500 - 750 kcmil)	
Utilco	Set Screw	Safety Sub Splice - USPA-350SS	

U gp - Connector Blocks and Splices, Secondary

Non-Watertight - For Use In Above-Grade Pedestals Only

<u>Manufacturer</u>	Connection Type	<u>Catalog Number</u>
Blackburn	Set Screw	Type PSB-C
Connector Mfg. Co.	Set Screw	Uni-Joint Series NCA
ESP	Set Screw	UPC Series
Fargo	Set Screw	GUS-6000 Series
Homac	Set Screw Set Screw	CLR-350 Series PVAB Series
Utilco	Set Screw	PED-350-IN Series

U gq - Boot or sleeve, insulated*

Manufacturer

Blackburn

MPC9

MPC15

Electrical Materials

100-B (For pad-mounted transformer spade terminals)

^{*}Use restricted to 120/208 volt 500 kVA transformers and larger not equipped with threaded studs.

U gu - Pedestal, Power

Refer to Construction Drawings UK5

Applicable Specifications: "REA Specifications for Secondary Power Pedestals," U-6

	Inside Dimensions	Height	a
<u>Manufacturer</u>	Inches	Inches	<u>Catalog No.</u>
Coil Sales			
(Charles Industrie	es) 8.25 Dia	31-1/2	CPLP-8
,	8.25 Dia	31-1/2	CPLP-8I(Integral Stake)
	10.75 Dia	31-1/2	
	10.75 Dia	31-1/2	CPLP-10I(Integral Stake)
			_
<u>Electrimold</u>	14.5×19.5	31.5	ESP-1419-31
	23 x 23	30	ESP-2323-30
Fiberglas	14 X 9	31	FFSP Series
Fabricators	15.5 X 15.5	30	FFSP Series
FADIICACOIS	15.5 X 15.5	36	FFSP Series
	14 X 9	42	FFSP Series
	9 X 9	31	FFSP Series
	J K J	31	FFDF Delles
Kearney/Western	9-1/2 x 9-1/2	30	*SPM-9 DF3
Power	14-1/2 x 9-1/2	30	*SPM-14 DF3
	9-1/2 x 9-1/2	36	SPM-91 DF3
	9-1/2 x 9-1/2	30	SPM-90 DF3
	14-1/2 x 9-1/2	30	SPM-140 DF3
	$14-1/2 \times 9-1/2$	36	SPM-145 DF3
	18-1/2 x 12	30	SPM-182 DF3
	18-1/2 x 12	54	SPM-190 DF3
<u>Nordic</u>	8 x 8	44	PR-50, PR-55
	9 x 14	30	PR-149 (stake)
			PR-150 (stakeless)
	$8-1/4 \times 13$	30	PRMC-150 (stakeless)
	$8-1/4 \times 13$	36	PRMC-190 (stakeless)
m - 1 4 - 1-1 -	0 0	3.0	IID OIII D
<u>Reliable</u>	8 x 8 8 x 8	38 46	UP 8HLP UP 8HP
	8 x 8 10-1/2 x 10-1/2	26	UP 10HLP
	10-1/2 x 10-1/2 16-1/2 x 10-1/2	36	UP 1016HLP
	10-1/2 x 10-1/2 10-1/2 x 10-1/2	42	UP 10HP
	10-1/2 X 10-1/2	42	UP TOHP
<u>Shallbetter</u>	7.5 x 10.25	39	SUTP Series
Utility Fiberglass	<u>s</u> 27 x 16	40	PPFP-2700
<u>Vertex</u>	8 x 14	30	SP 814

^{*}Furnished with stake.

^{**}Pole mounted

U gu - Power Pedestal Refer to Drawings UK6

Applicable Specifications: "REA Specifications for Secondary Power

Pedestals," U-6

Manufacturer Catalog No.

Armorcast Polymer concrete frame and cover with

fiberglass reinforced polyester

skirting 6001 Series.

Associated Plastics Molded polyethylene with

galvanized steel or plastic cover
Catalog Nos. 1730-1, 3; 1324-1, 3

<u>Blackburn</u> Molded polyethylene with

galvanized steel cover and

ground lug.

Catalog No. SDR-2PG

<u>Burndy</u> Molded polyethylene with

galvanized steel cover. Catalog No. URD20G23

<u>Carson</u> Molded polyethylene with plastic cover

Catalog No. 1324-12B and 1730-12B

<u>CDR Systems (Homac)</u> Fiber reinforced polymer concrete

PA Series with penta-head bolts

Dexol HDPE, DX-101

DX-102

ABS, DX-101HD DX-102HD

<u>Electrimold</u> Polymer concrete ring

and cover with fiberglass reinforced skirting E series

Farqo HDPE, B-100R Series

ABS, B-200R Series

<u>Fiberglas Fabricators</u> FFHH Series, Fiberglass

FFHHPC Series, Fiberglass polymer

concrete hybrid

<u>Highline</u> HL50AE

HL51

Malton Fiberglass secondary pedestal

FSP31139, FSP301515

<u>Pen-Cell</u> Molded polyethylene with

galvanized steel or plastic cover

Catalog No. PE-20-REA Polycarbonate Box cover Catalog No. AG-20-6-REA U gu - Power Pedestal Refer to Drawings UK6

Applicable Specifications: "REA Specifications for Secondary Power

Pedestals," U-6

Manufacturer Catalog No.

Thermodynamics PP-91 and PPV-91 Series

Power Pedestal - PV Quazite

Boxes - PX/PE Series, PR/LR Series, PC,

PG, LG Series

U gv - Stake, Power Pedestal Refer to Construction Drawing UK5

	Length	Catalog No).
Manufacturer	<u>Inches</u>	For Power Pedestal Only	For Joint Pedestal
	40 60 70 70	IID FOOD Good on	HD FOOT G
Fargo	42-60-72-78	UP-530S Series	UP-530J Series
Reliable	72-78-84	DM Series	DM Series

U hb - Cable Accessories (When ordering specify conductor size, type whether copper or aluminum and insulation diameter)

(Items on this page are rated for operation on three-phase systems and may be used on single-phase systems.)

200 Ampere Continuous Current Rating

Manufacturer

Catalog No.

Chardon Electrical Components

15 kV, used with loadbreak connectors Switch module 9U02AAB001 Basic connector module 9U05 Series Insulating cap 9U01AEW400 Feed-through insert 9U04AEB001

25 kV, used with loadbreak connector switch module 9U02BAB001 Insulating cap 9U01BEW500 Feed-through insert 9U04BEB001

Cooper Power Systems (RTE)

15 kV, used with loadbreak connectors

No. 2603711U protective cap

No. 2604797B01M bushing well insert

No. 2637869C01M rotatable two-way bushing well insert

No. 2604231B01 bushing well plug

25 kV, used with loadbreak connectors

No. LPC 225 protective cap

No. 2637612C01M bushing well insert

No. 2637881C01M rotatable two-way bushing

well insert

No. 2604231B01 bushing well plug

35 kV, used with loadbreak connectors

No. 2637592B03M protective cap

U hb - Cable Accessories (When ordering specify conductor size, type, whether copper or aluminum and insulation diameter)

(Items on this page are rated for operation on three-phase systems and may be used on single-phase systems.)

200 Ampere Continuous Current Rating

B/1	F	+11200	
Manui	Lac	ture.	<u> </u>

Catalog Number

_			
Elas	at i ma	പ്പ	(ESNA)

15 kV, used with loadbreak connectors

Style 1601-CL cable lead

Style 1602A3R feed thru insert

Style 1601-A3R bushing plug

Style 160-DR insulating cap

25 kV, used with loadbreak connectors

Style 2701-A2 bushing plug

Style 270-DR deadend receptacle

35 kV, used with loadbreak connectors

Style 3701A-3 bushing plug*
Style 370DR(G) insulating cap

<u>Joslyn</u>

15 kV, used with loadbreak connectors

Type LBIC152 Insulating Cap

25 kV, used with loadbreak connectors

Type LBIC252 Insulating Cap

U hb - Cable Accessories

(When ordering, specify conductor size, type, whether copper or aluminum and insulation diameter)

600 Ampere Continuous Current Rating

600 Ampere	Continuous Current Rating
Manufacturer	Catalog Number
Cooper Power Systems (RTE)	Deadbreak termination connectors Bol-T System T-OP II System Push-OP System Optional 200 A. loadbreak tap No. 2638460B 25 kV Deadbreak termination connectors Bol-T System T-OP II System Push-OP System Optional 200 A. loadbreak tap No. 2637978C 35 kV Deadbreak termination connectors Bol-T System T-OP II System T-OP System T-OP II System Push-OP System Optional 200 A. loadbreak tap No. 2637449C
Elastimold (ESNA)	<pre>15 kV, used with non-loadbreak connectors 600, 650 Series 25 kV, used with non-loadbreak connectors K600, K650 Series 35 kV, used with non-loadbreak connectors 750LR Series</pre>
<u>Joslyn</u>	15 kV, used with non-loadbreak connectors PES86/PSS8625 kV, used with non-loadbreak connectors PES86S/PSS86S
<u>3M</u>	15 kV, Deadbreak termination connectors 5815 Series Modular Splicing System

U hb - Cable Accessories

(When ordering specify insulation diameter)

Concentric Neutral Clamps (Bonding)

Meeting No. and Date Conditions

Manufacturer

<u>Harco</u>		
URD cable clamp	1114 05/12/77	1. To obtain experience.
		 Only for bonding of anodes or other metals to the neutrals of <u>existing</u> cable installations.
		 Not to be used to connect neutral to grounding electrodes.

U hc - <u>Cable Supports</u> 15 and 25 kV

<u>Manufacturer</u>	Catalog Number	Grip Dia. Range (inches)
Aluma-Form	CS-800 Series	0.75 to 2.0
Economy Cable Grip	SPJ087-U SPJ100-U SPJ113-U SPC125-S-U	0.87 to 1.00 1.00 to 1.12 1.12 to 1.25 1.25 to 1.50
Fargo	GJ-854 GJ-855 GJ-856	0.718 to 0.919 0.920 to 1.12 1.12 to 1.50
Kellums	022-16-011 022-16-012	0.81 to 0.94 0.87 to 1.00
	022-16-013 022-16-014 022-16-015 022-01-018	0.94 to 1.06 1.00 to 1.18 1.06 to 1.25 1.25 to 1.50
Lewis	A-U-SW-18 U-1.12	0.75 to 1.25 1.12 to 1.62
Slater	FCSD 14 FCSD 15 FCSD 16 FCSD 17 FCSD 18 FC125-U	0.82 to 0.95 0.88 to 1.00 0.95 to 1.06 1.01 to 1.19 1.07 to 1.26 1.25 to 1.50
Woodhead	35032 (SC075-U) 35033 (SC100-U 35034 (SC125-U)	

U hd - Brackets, pothead mounting and Brackets, combination pothead and arrester mounting

<u>Manufacturer</u>	Single Phase	Three Phase
Aluma-Form	TB-EMB-1-2PA	TB-EMB-1-6PA

12.5/7.2 kV

Manufacturer	Catalog Number	
ABB	UTE, PAD-PAK pad-mounted switching device, single and three-phase, 300 amp	
Cooper Power Systems (McGraw-Edison)	EH3A Series, single-phase, pad-mounted	
Durham	AFSP Series, single-and three phase	
Electrical Equipment	FTDF-P Series, single and three-phase one and two fused taps, pad-mounted	
Elliott	Type EPMR, single and three-phase, pad-mounted	
<u>Malton</u>	*ME Fused Series, single and three-phase pad mounted.	
<u>s & c</u>	Mark III, Models PMS (with option G-7) 200 ampere three-pole switching and 200 ampere single-pole switching	

^{*}Furnished with current limiting fuses.

- NOTE 1. Enclosures on this page must comply with the dead-front requirements of REA Spec. U-4.
 - 2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
 - 3. Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

24.9/14.4 kV

Manufacturer Catalog Number

ABB UTE, PAD-PAK pad-mounted switching device,

single and three-phase, 200 amp

Cooper Power Systems (RTE) Type LBS, single- and three-phase, pad-

mounted, 300 amp

FuseTER Series, single-phase and three-phase

<u>Durham</u> AFSP Series, single-and three phase

Elliott Type EPMR, single- and three-phase, pad-mounted

Malton ME Fused Series, single and three phase, pad-

mounted

- NOTE 1. Enclosures on this page must comply with the dead-front requirements of REA Specification U-4.
 - 2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
 - 3. Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

(200 and 600 amp)

Manufacturer Catalog Number Chance Type LVS (submersible and pad-mounted) single-phase and three-phase, vacuum switching equipment, fused or unfused. 200 or 600 amp, 15-25 kV Type AIS padmounted, air insulated switchgear, fused or unfused, 200 or 600 amp, 15 kV or 25 kV Cooper Power Systems Type VFI, single-phase and three phase, padmounted fault interrupters, 15-35 kV Type LBS, single- and three-phase, pad-mounted 15 kV Type R-VAC, three-phase vacuum switchgear, 15-25 kV Electrical Equipment Type PSI-PSI/II Series, 15 kV, 25 kV, 600 amp., three-phase switching, and 200 amp., single-phase switching. (When ordering, add suffix B-4) Type PSE Series, 15 kV, 25 kV, 600 amp switch, 200 amp fuse Type PGE Series, 15 kV, 25 kV, SF6 interrupter, 3-phase, 600 amp switch, 200 amp fuse Elliott Type EPMR, Single and three-phase, pad-mounted, 25 kV Type PVI series, single-phase and G & W three-phase, 200 amp and 600 amp, 15 kV and 25 kV Types PG6, PFG6, LPG6, LPFG6, SG6, SFG6 Joslyn (submersible and pad-mounted, fused or unfused) single and three-phase switching equipment, 200 and 600 amp, 15 or 25 kV

- Note 1: Enclosures on this page must comply with the deadfront requirements of REA Spec. U-4.
 - 2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
 - 3. Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

(200 and 600 amp.)

Manufacturer Catalog Number Series VP - submersible, single-phase and Kearnev three-phase, vacuum switching, 200 or 600 amp, 15 and 25 kV, with or without VACOP remote operator MES 100 Series, pad-mounted single phase Malton and three phase switching Type SPM-REA, 15 kV, 25 kV, 600 amp., Scott Engineering three-phase switching, and 200 amp., single-phase switching Mark III, Model PMH (with option G-7), S & C 15-25 kV, 600 amp., three-phase switching and 200 amp., single-pole switching Model PME-15-25 kV, Fully enclosed live parts at all times, three-phase switching and 200 amp single pole

<u>Trayer</u>

800 Series, pad mounted three-phase vacuum switching equipment, 200 and 600 amp., 15-25 kV with or without fusing 501 submersible vacuum fuse enclosure, deadfront 200 or 600 amp., 15-25 kV Type SSA (submersible, fused and unfused) 200 and 600 amp., 15-25 kV

Note: 1. Enclosures on this page must comply with the deadfront requirements of REA Spec. U-4.

switching

- The enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
- 3. Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U hf - Jacketed Cable Restoration Kits (For resealing concentric neutral wires after installation of splices in jacketed underground cable.)

(When ordering, specify diameter of cable over jacket.)

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
Elastimold PCS-1 Power Cable Seal	1341 05/14/87	To obtain experience.
Homac CNC Series Concentric Neutral Cover	1365 06/23/88	To obtain experience.
Raychem WCSM (Tubing Type) MWTM (Tubing Type) CRSM (Wraparound Type)	1354 12/31/87	To obtain experience.
3M HSJ Series (Heat Shrink) SJ Series (Cold Shrink)	1369 09/08/88	To obtain experience.

U hf - Terminator Sealing Kits
(For resealing concentric neutral wires after installation of elbows or outdoor terminations on jacketed underground cable.)

(When ordering, specify diameter of cable over jacket.)

<u>Manufacturer</u>	Meeting No. and Date	<u>Conditions</u>
Elastimold 200 ECS Elbow Cable Shield, Cold Shrink	1356 01/28/88	To obtain experience.
Homac CNC Series Concentric Neutral Cover	1365 06/23/88	To obtain experience.
Raychem ESA, Heat Shrink	1354 12/31/87	To obtain experience.
3M 8450 Series, Cold Shrink	1336 02/26/87	To obtain experience.

Conditional List U hf(3) July 1994

U hf - Jacketed Cable Grounding Kits
(For connecting a grounding lead wire to the concentric neutral wires and resealing the jacket.)

(When ordering, specify diameter of cable over jacket.)

Manufac	turer	Meeting No. and Date	<u>Conditions</u>
			.
<u>3M</u>		1367	To obtain experience.
Model 2	252	07/28/88	_
Cable G	rounding Kit		
Raychem			
Model J	GK	1487	To obtain experience.
Cable G	rounding Kit	06/16/94	

U hj - Bracket, combination arrester, cutout and pothead mounting

Applicable Drawing: UM2, UM2A, UM2-4

<u>Manufacturer</u>	<u>Single Phase</u>	<u>Three-Phase</u>
Aluma-Form	1HCA-18-1PB Series	
Cooper Power Systems (McGraw-Edison)	DC51B1	DC52B1

U hp - Terminations, Elbow (rated for switching on three-phase systems)

(When ordering, specify conductor size, type, whether copper or aluminum and insulation diameter)

<u>Manufacturer</u>	<u>Catalog Number</u>
Chardon Electrical Components	15 kV, Loadbreak 9U01A6Series 25 kV, Loadbreak 9U01B5Series
Cooper Power Systems (RTE)	15 kV, Loadbreak SBT IV 2604600B Series with test point 2604599U Series without test point 25 kV, Loadbreak SBT 2604740B Series with test point 2604741B Series without test point
Elastimold (ESNA)	15 kV loadbreak Style 165LR, without voltage test point Style 166LR, with voltage test point Style 167LR, without voltage test point Style 168LR, with voltage test point 25 kV loadbreak Style 271LR, without voltage test point Style 272LR, with voltage test point Style 273LR, without voltage test point Style 274LR, with voltage test point Style 274LR, with voltage test point 35 kV loadbreak Style 375LR, without voltage test point Style 376LR, with voltage test point
<u>Joslyn</u>	15 kV, Loadbreak LBT112M (without test point) LBT112TM (with test point) 25 kV, Loadbreak LBT262M (without test point) LBT262TM (with test point) 15 kV, Fused Loadbreak

SPF-T (with test point)

U hq - Terminations, Multipoint

(Items on this page are rated for operation on three-phase systems and may be used on single-phase systems.)

<u>Manufacturer</u>	<u>Catalog Number</u>
Chardon Electrical Components	15 kV 2-way bushing 9U07A2-0 3-way bushing 9U07A3-0 4-way bushing 9U07A4-0 25 kV 2-way bushing 9U07B2-0 3-way bushing 9U07B3-0 4-way bushing 9U07B4-0
Cooper Power Systems (RTE)	<pre>15 kV 2-way, 3-way,& 4-way bushings Series 2637172B with mounting bracket Series 2637164C without mounting bracket 25 kV 2-way, 3-way,& 4-way bushings Series 2637160B with mounting bracket Series 2637166C without mounting bracket</pre>
Elastimold (ESNA)	15 kV 2-way bushing, 163J2 3-way bushing, 163J3 4-way bushing, 163J4 25 kV 2-way bushing, 271J2 3-way bushing, 271J3 4-way bushing, 271J4 35 kV 2-way bushing, 373J2 3-way bushing, 373J3 4-way bushing, 373J3

U hg - Terminations, Feed-Through and Parking Bushings

Manufacturer

Catalog Number

Chardon Electrical Components

15 kV

Insulated Parking Bushing, 9U07ACF100 Grounded Parking Bushing, 9U07AAF100

25. kV

Feed-through, 9U07BCF200

Feed-through, 9U07AKF200

Insulated Parking Bushing, 9U07BCF100 Grounded Parking Bushing, 9U07BAF100

Elastimold (ESNA)

35 kV

Feed-thru, 373FT

Parking Bushing, 371SOP

U hq - Terminations, Multipoint

600 Ampere Continuous Current Rating

Manufacturer

Catalog Number

Cooper Power Systems (RTE)

15 kV and 25 kV

2-way, 3-way, and 4-way bushings Series 2604670B (with mounting bracket) Series 2601496C (without mounting bracket)

35 kV

2-way, 3-way, and 4-way bushings

Series 2637195C (with mounting bracket)
Series 2637184C (without mounting bracket)

Elastimold (ESNA)

15 kV

2-way bushing, 650J2 or 675J2

3-way bushing, 650J3 or 675J3

4-way bushing, 650J4 or 675J4

25 kV

2-way bushing, K650J2 or K675J2

3-way bushing, K650J3 or K675J3

4-way bushing, K650J4 or K675J4

U hr - Secondary tap or splice cover, submersible

Manufacturer Type or Catalog No.

Blackburn Type WDBS (#2 through #4/0)

Type DBS (250 KCMIL through 1000 KCMIL)

Connector Mfg. Co. Utilug Sure Seal

Elastimold (ESNA) Style 86

ESP TSC Series

Homac FSS Series

Kearney Aqua-Seal Kit

Plymouth/Bishop Splice-Wrap

Raychem Rayvolve RVS Series

3M PST Series 8420

Heat Shrink Tubing (with sealant throughout)

Manufacturer Type or Catalog No.

AMP Black heat-shrink tubing

CANUSA-EMI CFW

ESP HSH

Panduit Heat shrink insulating cover and tubing

Raychem WCSM cable sleeves

Sigmaform Corporation Sigmaform heat-shrinkable products

3M ITCSN tubular cable sleeve

U hv - Cable, Underground 15 kV Cable

Applicable Specification: Conductor: Insulation: REA Specification U-1

Copper or Aluminum - #2 AWG through 1000 kcmil

Crosslinked Polyethylene (XLP)

(a) indicates Union Carbide 4201 XLP

(b) indicates BP 521 XLP

Tree-retardant Crosslinked Polyethylene (XLP-TR)

(1) indicates Union Carbide 4202 XLP-TR

(2) indicates BP H119Y XLP-TR(3) indicates BP H118Y XLP-TR

Ethylene Propylene Rubber (EPR)

Copper Concentric Neutral

High Molecular Weight Polyethylene

Neutral: Jacket:

<u>Manufacturer</u>	Insulation(s)	Flat Strap Neutral <u>Available</u>
Alcatel Canada Wire	XLP (a), XLP-TR (1), EPR	No
Cablec	XLP (a,b), XLP-TR (1,3) EPR	Yes
Conductores Monterrey,		
S.A. de C.V.	XLP (a), EPR	No
Condumex	XLP (a), XLP-TR (1), EPR	No
Hendrix	XLP (a), XLP-TR (1, 2, 3) EPR	No
Kerite	EPR	Yes
Okonite	XLP (a), XLP-TR (1), EPR	Yes
Pirelli	XLP (a), XLP-TR (1), EPR	Yes
Rome	XLP (a), XLP-TR (1), EPR	Yes
Southwire	XLP (a), XLP-TR (1)	No

^{*}For grounding purposes insulated jacketed cables must be treated like overhead lines, i.e., at least four ground rods must be installed per mile in accordance with the NESC. (This does not include service grounds, etc., but does include equipment grounds.) Additional grounding may be necessary in soils with higher resistivity or in sections where random separation is used. In splices or tap connections, a good seal should be achieved to exclude moisture.

U hv - Cable, Underground 25 kV Cable

Applicable Specification:

Conductor:

Insulation:

REA Specification U-1

Copper or Aluminum - #1 AWG through 1000 kcmil

Crosslinked Polyethylene (XLP)

(a) indicates Union Carbide 4201 XLP

(b) indicates BP 521 XLP

Tree-retardant Crosslinked Polyethylene (XLP-TR)

(1) indicates Union Carbide 4202 XLP-TR

(2) indicates BP H119Y XLP-TR

(3) indicates BP H118Y XLP-TR Ethylene Propylene Rubber (EPR)

Copper Concentric Neutral

High Molecular Weight Polyethylene

Neutral: Jacket:

<u>Manufacturer</u>	Insulation(s)	Flat Strap Neutral <u>Available</u>
Alcatel Canada Wire	XLP (a), XLP-TR (1), EPR	No
Cablec	XLP (a,b), XLP-TR (1,3) EPR	Yes
Conductorres Monterrey,		
S.A. de C.V.	XLP (a), EPR	No
Condumex	XLP (a), XLP-TR (1), EPR	No
Hendrix	XLP(a), XLP-TR (1,2,3) EPR	No
Kerite	EPR	Yes
Okonite	XLP (a), XLP-TR (1), EPR	Yes
Pirelli	XLP (a), XLP-TR (1), EPR	Yes
Rome	XLP (a), XLP-TR (1), EPR	Yes
Southwire	XLP (a), XLP-TR (1)	No

^{*}For grounding purposes insulated jacketed cables must be treated like overhead lines, i.e., at least four ground rods must be installed per mile in accordance with the NESC. (This does not include service grounds, etc., but does include equipment grounds.) Additional grounding may be necessary in soils with higher resistivity or in sections where random separation is used. In splices or tap connections, a good seal should be achieved to exclude moisture.

U hv - Cable, Underground

600 Volt Cable

Applicable Specification: REA Specification U-2 Conductor: Copper, #4 AWG and larger

Aluminum, #2 AWG and larger

Insulation : Cross-Linked polyethylene (XLPE)

Manufacturer Type Conductor

ACPC, Inc. Aluminum

Alcan Aluminum

Alcatel Canada Wire Aluminum

Cablec Copper or Aluminum

Conductorres Monterrey, Copper or Aluminum

S.A. de C.V.

Condumex Copper or Aluminum

Essex Copper

General Cable Aluminum

Okonite Copper or Aluminum

Pirelli Copper or Aluminum

Rome Cable Copper or Aluminum

Southwire Copper or Aluminum

NOTE: The manufacturers shown above have indicated that their 600 volt cable is suitable for use on 480 volt corner grounded delta circuits.

The above cable may be supplied with UL label for Type USE.

U hv - Cable, Underground

600 Volt Multi-Conductor Cable

Applicable Specification: REA Specification U-2
Conductor: Copper, #4 AWG and larger

Aluminum, #2 AWG and larger

Insulation : Cross-Linked polyethylene (XLPE)
Cable Configuration : 3 Insulated Conductors Triplexed

Manufacturer Type Conductor

ACPC, Inc. Aluminum

Alcan Aluminum

Alcatel Canada Wire Aluminum

Cablec Copper or Aluminum

Conductores Monterrey, S.A. de C.V. Copper or Aluminum

Condumex Copper or Aluminum

General Cable Aluminum

Okonite Copper or Aluminum

Pirelli Copper or Aluminum

Rome Cable Copper or Aluminum

Southwire Copper or Aluminum

The above cable may be supplied with UL label for Type USE.

U hv - Cable, Underground

600 Volt Cable

(Alternative Cable Constructions)

Applicable Specification: REA Specification U-2 (except as indicated below)

NOTE: Manufacturers listed below are conditionally accepted for alternatives A, B, and/or C for the products listed on pages U hv-3 and U hv-4.

Alternative A: 8000 series aluminum alloy in accordance with ASTM

B800 or B801.

Alternative B: Stranding in accordance with ASTM B786 for aluminum

1350 conductors or ASTM B787 for copper conductors.

Alternative C: Abuse resistant (ruggedized) (single or two layer)

insulation in accordance with ICEA P-81-570.

Condition: To obtain experience.

<u>Manufacturer</u>	Meeting No. <u>and Date</u>
Pirelli (C)	1487 06/16/94
Southwire (B) (C)	1487 06/16/94

U hw - Warning sign

Applicable Specifications: REA Drawings UM12-1 and UM12-2

		Danger Sign	Caution Sign
<u>Manufacturer</u>	Size (inches)	Catalog No.	Catalog No.
Brady*	7 x 10	46133	46043
	10 x 14	46131	46041
Eastern Metal*	7 x 10	REA 12-1-710	REA 12-2-710
	10 x 14	REA 12-1-1014	REA 12-2 1014
	14 x 20	REA 12-1-1420	REA 12-2-1420
	20 x 28	REA 12-1-2028	REA 12-2-2028
Electromark*	7 x 10	REA-1-7x10-SV	REA-2-7x10-SV
	7 x 10	REA-1-7x10-AC	REA-2-7x10-AC
	10 x 14	REA-1-10x14-SV	REA-2-10x14-SV
	10 x 14	REA-1-10x14-AC	REA-2-10x14-AC
	14 x 20	REA-1-14x20-SV	REA-2-14x20-SV
	14 x 20	REA-1-14x20-AC	REA-2-14x20-AC
	20 x 28	REA-1-20x28-SV	REA-2-20x28-SV
	20 x 28	REA-1-20x28-AC	REA-2-20x28-AC
Lem	7 x 10	LSS-1400	LSS-1500
	10 x 14	LSS-1401	LSS-1501
	14 x 20	LSS-1402	LSS-1502
Lyle*	7 x 10	UM12-1-710	UM12-2-710
	10 x 14	UM12-1-1014	UM12-2-1014
	14 x 20	UM12-1-1420	UM12-2-1420
	20 x 28	UM12-1-2028	UM12-2-2028
May Advertising	7 x 10	MY710C	MY710B
	10 x 14	MY1014C	MY1014B
	14 x 20	MY1420C	MY1420B
	20 x 28	MY2028C	MY2028B
	For pressure	sensitive decal add	"D" prefix
Truck Sign Service*	7 x 10	TSD-710	TSC-710
	10 x 14	TSD-1014	TSC-1014
	14 x 20	TSD-1420	TSC-1420
	20 x 28	TSD-2028	TSC-2028

^{*}Reflective signs also available.

The signs listed on this page are to be secured to equipment and transformer enclosures by means of an adhesive or by welding. Screws and rivets are not to be used.

U hx - Cable Route Marker

Manufacturer Catalog Number

Surface Mounted

Chance C554-0001

Above Grade

W. H. Brady BL1 (Decal on one side)

BL2 (Decal on both sides)

Carsonite REA-100

Chance C554-0183

Electromark REA-3-4x7-SV

REA-3-4x7-AC REA-3-5x12-SV REA-3-5x12-AC

Flexstake 603

604 605

606

Greenline FLU-78 (Decal on one side)

DSU-78 (Decal on both sides)

Lyle UM12-712

May Advertising MY45A

MY712A

For pressure sensitive decal add "D" prefix to catalog number.

Truck Sign Service BCW-712

U hy - Splice, Underground, Permanent

Manufacturer	Catalog Number
Chardon Electrical Components	15 kV Straight Splice through #1/0, Model 9U16A-100 "Uni-Matic" Through #2/0, Model 9U06A 25 kV "Uni-Matic" Through #2/0, Model 9U06A
Cooper Power Systems (RTE)	15 kV 2637858U Series straight splice (No. 2 thru No. 4/0 stranded) 25 kV 2606825A Series straight splice 35 kV 2603934B Series straight splice
Elastimold (ESNA)	15 kv Style 1500S, straight splice, through #1/0 Style 25-S, straight splice, #2/0 through #4/0 Style 15PCJ-1, straight splice, through 4/0 Style 25-Y, Y-splice 25 kV Style K-25-S, straight splice Style K-25-Y, Y-splice Style K-25-Y, Y-splice Style 25PCJ-1, straight splice, through 4/0 35 kV Style M-250-S, straight splice
<u>Joslyn</u>	Type PMS152 Straight Splice (15 kV) #4 through #1/0
<u>3M</u>	Quick Splice/Quick Splice II, 5400 Series (15, 25, and 35 kV)

15 kV

5411R cable repair splice

jacketed cable

5411R/HSJ-l cable repair splice (for

U hy - Splice, Underground, Permanent

(When ordering specify conductor size, type, whether copper or aluminum and insulation diameter)

Manufacturer

Catalog Number

Raychem

15 kV HVS 1510-R____ 200 Amp Splice kit

25 kV

For Bare Concentric Neutral Cable:
 HVS-2510-REAX in-line joint
 HVS-2510E-R-REAX repair joint
For Jacketed Cable:
 HVS-2510-JCN-REAX in-line joint
 HVS-2510E-RJ-REAX repair joint

35 kV

For Bare Concentric Neutral Cable: HVS-3510E-REAX in-line joint For Jacketed Cable: HVS-3510E-JCN-REAX in-line joint

Sigmaform

15 kV

SSK Series (Heat Shrink)

U hy - Splice, Underground, Separable

(When ordering specify conductor size, type, whether copper or aluminum and insulation diameter)

Manufacturer

Elastimold (ESNA)

Catalog Number

15 kV

Style 151-SR, receptacle

Style 151-SP, plug

Style 150-DP, deadend plug

Style 150-DR, deadend receptacle

Style 150-T, T-tap

25 kV

Style K-151-SR, receptacle

Style K-151-SP, plug

Style K-150-DR, deadend receptacle

Style K-150-T, T-tap

U hy - Splice, Underground, Permanent

(When ordering specify conductor size, type, whether copper or aluminum and insulation diameter)

600 Ampere Continuous Current Rating

Manufacturer

Catalog Number

Cooper Power Systems (RTE)

15 kV

2604904B Series straight splice (MPS-600)

25 kV

2604905B Series straight splice (MPS-600)

Elastimold (ESNA)

15 kV

Style 650-S, straight splice Style 15PCJ-2, straight splice, through 1250 MCM Style 650-Y, Y-Splice

25 kV

Style K650-S, straight splice Style K650-Y, Y-splice Style 25 PCJ-2, straight splice, through 1250 MCM

35 kV

Style M650S, straight splice

U ja - Transformer Pad

Manufacturer Catalog Number

Armorcast 600 Series*, Polymer Concrete

Associated Plastics API 4000 Series RPM

Carolina Dielectrics Model 0502-1, Fiberglass, Size:40"x44"

CDR Systems (Homac) PP Series*, Fiber reinforced polymer

concrete

Chance C107-0162 Fiberglass, Size: 40" x 44"

Diversitech TP Series - Fiberglass reinforced

concrete

Electri-Glass LP-4145, 41" x 45"

Electrical Materials Molded HMW Polyethylene

Model 64-3BC, 42" x 41" x 4"

Model 65-4BC, 52" x46"

<u>Electrimold</u> <u>ELP</u>

Fiberglas Fabricators FFBPPC Series, Polymer concrete hybrid

Formex Model TP-REA, Molded polyethylene

Heil Rotomold, Inc. T Series*, High density polyethylene

Highline HL-46B, Fiberglass, Size: approx.42"x42"

<u>Major Frame-Crete</u> ETPP precast, cellular concrete, 42"x42"

Nordic TP Series, Fiberglass

Quazite Corp. Composolite - PH Series

RMI-D Dwg. No. 730126-2, Molded polyethylene

Size: 42" x 42"

<u>Smith Cattlequard</u> Easi Set T. Series, Precast Reinforced

Concrete

Thermodynamics Poly-Pad, PR Series*, Molded polyethylene

*Order by catalog number and size.

U ja - Transformer Pad (Sleeve)

<u>Manufacturer</u> <u>Catalog Number</u>

Acura Fiberglass Corp. Model AG 3256 BP

<u>Associated Plastics</u> Transformer pad and box assembly,

API 4242 RPM Pad and 1730 Box Transformer Pads, API 16 and API 45

Blue Grass Vault Company BG-PV-T, BG-PV-1, BG-PV-2

<u>Concast</u> Fibercrete modular bases

<u>D & L</u> Fiberglass

Electri-Glass, Inc. BP-2000

Electrimold EBPT, EBPS, EGS Series

<u>Fiberglas Fabricators</u> Transformer pad and sleeve assembly,

FFBP series

Formex Transformer pad and box assembly

TP-REA Series Pad 1730-A Series Box

<u>Highline</u> Box pad HL-45A, Size: L-43", W-34-1/2", D-32"

Malton FGS Series

Fiberglass ground sleeves and box pads

<u>Maysteel</u> CW-GS-P Series

Mor-Tech Fab Transformer pad ground sleeves

Nordic GS Series Fiberglass

Thermodynamics Poly Pad - VC series (VCC-P series covers

available) Polyethylene

^{*}Order by catalog number and size.

U jb - Splice Shield (Refer to Drawing UM45-4)

Manufacturer Catalog Number

<u>Kellems</u> No. 014-03-1429

U sc - Regulators, voltage, pad-mounted for underground distribution

12.5/7.2 kV

Manufacturer

Meeting No. and Date

Conditions

Siemens-Allis Single-phase, step-type pad-mounted regulator Type PFR (76.2, 114.3 & 167 kVA)

994 06/29/72 To obtain experience.

U sd - Current Transformers 600 Volt

Direct Burial Type

Manufacturer Type or Catalog No.

General Electric JAL-0

Indoor Type for Pad-Mounted Transformers

Manufacturer

ABB

CMV

G.E.C. Durham Industries (Astra)

General Electric

Schlumberger

R6P

U si - Anodes, Sacrificial (Drawings UM11-1, UM26, UM27, M2-7, M2-17)

Zinc Anodes*

Pre-packaged With Connecting Wire			Bare Continuous Strip (Ribbon)		
	12 lbs.	30 lbs.	60 lbs.	5/8" x 7/8"	1/2" x 9/16"
Cathodic Protection Services	12HII-4A	30HII-4A	60HII-4A		
Federated Metals	S-12 packaged	S-30 packaged	S-60 packaged	Regular Size Type II	Junior size
Harco	AZC12GJ	AZC30GJ	AZC60HJ		
Mesa	S-12 packaged	S-30 packaged	S-60 packaged	Regular Size	Junior size
Stuart	SZ-12 VIBR	SZ-30 OX package	SZ-60 d		

^{*}When ordering, specify zinc anodes that meet ASTM B418-73 Type II Composition and REA Specification DT-9, "REA Specification for Zinc Sacrificial Anodes."



U si - Anodes, Sacrificial (Drawings UM11-1, UM26, UM27, M2-7, M2-17)

Magnesium Anodes**

<u>Standard Potential</u> <u>High Potential</u>

	17 lbs 20 lbs	32 lbs	50 lbs	<u>17 lbs</u>	20 lbs	32 lbs	<u>48 lbs</u>
	AMH17A on packaged	-	AMH50A packaged	17D3 d packag	20D2 ed packa	32D5 aged packa	48D5 aged packaged
Federated Metals	d 17 packaged	32 packaged p	50 packaged				
Harco	AMC17J AMC20J	AMC32J	AMC50J	AMC17G	AMC20G	AMC32G	AMC48G
	17 Vibra Pak	32 Vibra Pak	50 Vibra Pa				50 Electromag Vibra Pak
Mesa	17 packaged	32 packaged]		17D Series	20D2	32D Series	48D5
Stuart	SM-17	SM-32	SM-50	SM-17H		SM-32H	SM-48H

^{**}When ordering, specify magnesium anodes that meet REA Specification DT-10, "REA Specification for Magnesium Sacrificial Anodes."

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